Framing Collaborative Governance

New approaches for maintaining Dutch floodplains

Jan Fliervoet

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TABLE OF CONTENTS

CHAPTER 1

General introduction

1.1 INTRODUCTION

Contemporary river basin management is characterized by the integration of functions and interests (Schindler et al., 2013; Warner et al., 2013; Pahl-Wostl, 2006), making management strategies of rivers and floodplains rather complicated. Overall, integrated river basin management cannot be tackled by organizations that act alone. This means that the involved organizations need to explore collaborative approaches in order to integrate perceptions, interests and resources. This collaborative paradigm in river basin management is fed by concepts such as stakeholder participation, co-design and co-creation (Tippett et al., 2005; Leach et al., 2002; Orr et al., 2007), and methodologies, such as adaptive governance (Folke et al., 2005), network governance (Klijn et al., 1995; Rhodes, 2007) and collaborative governance (Emerson et al., 2012; Ansell and Gash, 2008). The increased attention on more collaborative approaches in river basin management is, for example, reflected in the increased number of peer-reviewed articles dealing with the subject. This increase is illustrated by a search in Web of Science (Figure 1.1). Despite a broad recognition of this new paradigm, stakeholders struggle with the question of how to shape collaborative governance in the context of integrated river basin management. Therefore, the aim of this research was to analyze the complexity of the current collaborative, cross-sectoral interactions between governmental and non-governmental actors. These complex arrangements are analyzed with case studies within the context of multi-functional floodplain maintenance.

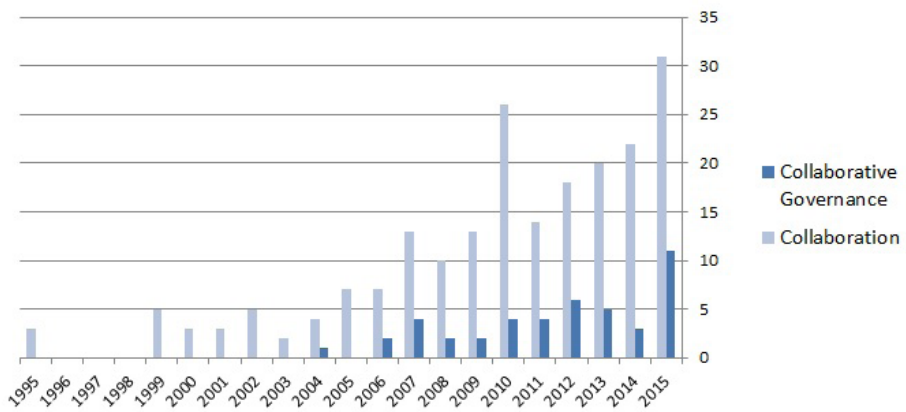

Figure 1.1 | The number of articles including the terms "River management" and "Collaborative governance" or "Collaboration" in the title, abstract or keywords based on the Web of Science (Data base 29-01-2017).

1.1.1 Historical background of river basin management in the Netherlands

A shift towards integrated and collaborative approaches in river basin management in the Netherlands began in 1985 with a strategic annotation entitled "Dealing with water" (in Dutch: "Omgaan met water") (Figure 1.2). This document integrated a vision of water quality and quantity issues, which included a requirement for evidence to support an ecosystem-based approach (Van

Heezik, 2006). In 1989, this vision was translated into policy targets in the water policy document (in Dutch: derde nota waterhuishouding), in which the concept of integrated water management was mentioned for the first time. In this new concept an integrated and ecosystem approach is emphasized in which all aspects of the water system and social interests are balanced in the decision making processes. Additionally, Rijkswaterstaat (the national water authority) experienced *"that it is important to have a balanced administrative approach involving all the relevant authorities rather than with a single authority, i.e. the government alone"* (Saeijs, 1991, p. 250). The focus in the third water policy document is guided by three visions for rivers: "navigation hub", "recolonization of the salmon in the Rhine and Meuse Rivers" and "greening the landscape". The latest two visions connected water management to the increased attention on river restoration projects (Smits et al., 2000). This shift towards nature rehabilitation was initiated by the presentation of the report "Plan Stork" (De Bruin et al., 1987). Plan stork focused on returning key species such as, the black stork, to restore the biodiversity of the floodplains that were lost due to agricultural activities in the floodplains during the last few centuries. This plan suggested that the restoration of the natural, dynamic (unregulated) river system could be accomplished by transforming agricultural land use in floodplains into "self-regulating" nature areas through reinstating natural erosion and sedimentation processes. In the year 2000, Plan Stork received support from European policy guidelines such as the European Water Framework Directive and Natura2000 (Mostert, 2003). This resulted in a steep increase in nature reserves in the floodplains as authorities began buying agricultural land and handing it over to nature conservationists (Van Heezik, 2006; Wiering and Van de Bilt, 2006). The focus on water quality and the ecological health of the river system was also fueled by the international Sandoz disaster. In 1986, the chemical company Sandoz in Switzerland caught fire, resulting in the discharge of toxic pesticides into the river Rhine which caused massive fish mortality over hundreds of kilometers (Van Heezik, 2006). This catastrophic event also led to the development of the perspective "recolonization of the salmon in the Rhine and Meuse Rivers".

Although the concept of integrated river basin management was elaborated on and applied on a small scale in the 1980s, the near flood events in 1993 and 1995 accelerated the implementation of integrated river basin management (van Stokkom et al., 2005; Wolsink, 2006; Rijke et al., 2012). The extreme high water levels in 1993 and 1995 nearly caused dike breaches and led to the evacuation of 250,000 people in January 1995 (Rijke et al., 2012). Moreover, it created an awareness that new ways of river basin management were needed in contrast to the traditional, technocratic approach (Leuven et al., 2000). Based on this awareness, the "Room for the River" program was launched in 2006, and resulted in a comprehensive package of measures intended to accommodate a discharge capacity of 16,000 m^3 /s and contribute to the improvement of the spatial quality of the riverine area (Rijke et al., 2012). This dual objective is reflected in the construction of new side channels throughout the floodplains that increased the water discharge capacity of the river and offered space for nature restoration. Moreover, this program led to a shift from the former one dimensional agricultural function to multi-functional floodplains that combine flood protection, nature restoration, the mining of sand and clay, recreation and agricultural use (Pahl-Wostl, 2006).

Implementation of integrated river basin management demands dialogue and interaction between all stakeholders (Orr et al., 2007), and stresses the need for cross-sectoral and multi-level collaboration (Zevenbergen et al., 2013), in combination with strong collaborative leadership (Van den Brink et al., 2011). In this context, a bottom-up and multi-stakeholder program called *"WaalWeelde"* was launched by the University of Nijmegen to connect public, private and societal organizations in the planning and implementation phases of river basin management (Smits, 2009). This integrated multi-player program aimed to develop a safer, more natural and economically stronger riverine landscape. The stakeholder collaboration within the Room for the River program in which governmental organizations in different disciplines (e.g. flood safety, planning, agriculture and nature), and at multi-levels (national, regional and local), are actively collaborating, resulted in 39 regional river widening projects (Van den Brink, 2009; Rijke et al., 2014). Worldwide, collaborative approaches led to the creation of multi-stakeholder platforms, such as river basin organizations, collaborative watershed partnerships, and "collaborative superagencies" (cf. Jaspers & Gupta, 2014; Pratt Miles, 2013; Sabatier et al., 2005 p. 7). The functions and sustainability of those collaborative platforms will be discussed in this research.

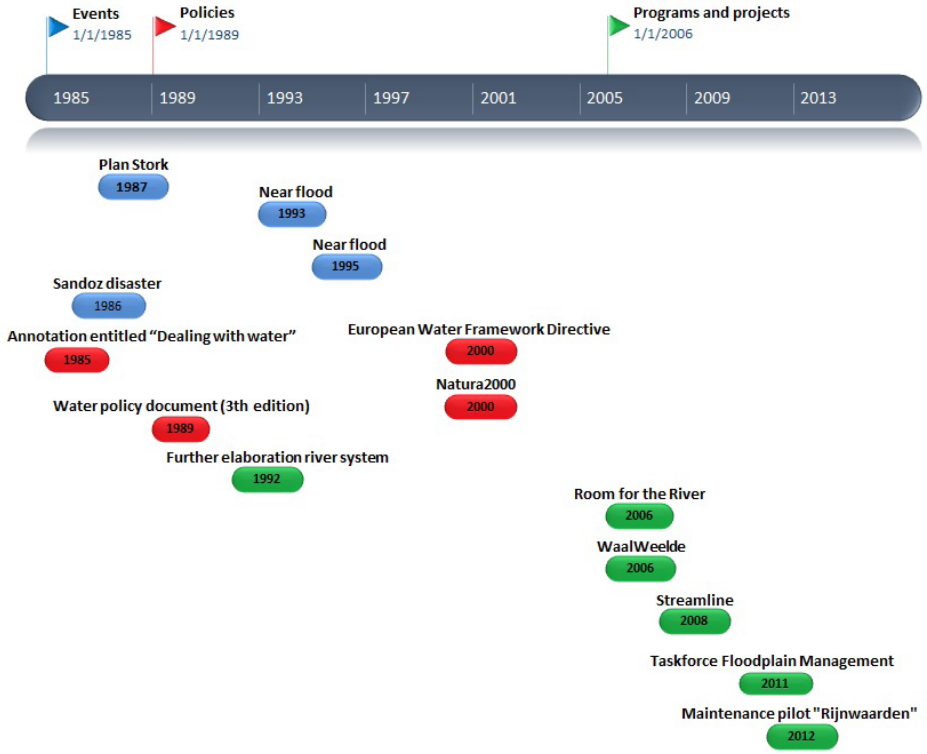

Figure 1.2 | Timeline of influential events (blue), policies (red) and programs (green) during the shift towards more collaborative and integrative approaches in Dutch river basin management.

1.1.2 The challenge of maintaining multi-functional floodplains

The above paragraph reveals that collaborative and integrated approaches are part of the planning and implementation phases of Dutch river basin management. However, these approaches are not yet incorporated into the maintenance phase. While the planning and implementation phases modify the functions of the floodplains, the maintenance phase aims to sustain and develop these functions through monitoring, development of ecological values and coordination of practices and maintenance approaches. The continuation and development of collaborative initiatives are indispensable in this phase as they sustain the multi-functionality of floodplains as formulated in the former two phases. However, this leads to new collaborative challenges because of changing stakeholder configurations, long-term processes and conflicting perspectives regarding the maintenance of multi-functional floodplains. The maintenance phase changes the combination of involved stakeholders in the collaborative process because maintenance activities are often performed on a local scale and in all floodplains, even including floodplains where no change of function occurred due to management interventions. The new actor configuration results from the inclusion of a large group of local users , such as local nature conservation organizations, land owners and farmers, who combine agricultural activities with nature management on their property.

Additionally, the collaborative maintenance of floodplains is characterized by a slow and politically unexciting process, in other words, it rarely brings photo opportunities for directors. At the same time, the process benefits from long-term strategic planning, which often exceeds the horizon of politicians and officials. Thirdly, water and nature managers may hold conflicting frames with regard to maintaining vegetation growth in floodplains. For flood safety reasons, water managers may want to remove the vegetation, while nature managers may not want to intervene allowing spontaneous nature development to occur. The latter non-interventionist approach is strengthened by the European Natura2000 policy. In practice, this issue is referred to as the *"nature-safety"* dilemma (Vreugdenhil, 2010), which is further elaborated in chapter 2. Literature also emphasizes the need for a better understanding of stakeholder's frames on the allocation of tasks and related responsibilities during collaborative processes in the context of river basin management (e.g. Curtis et al., 2002; Parker et al., 2010).

This research will analyze underlying visions and approaches used by practitioners to give insights into the complexity of apparent opposing functions, visions and interests, but it will also show opportunities to reconcile several functions and interests that could reinforce each other. Clear examples for combining flood protection and nature values are; the Cyclic Floodplain Rejuvenation management strategy (Smits et al., 2000; Baptist et al., 2004), and the design strategy of "building with nature" (van Slobbe et al., 2013). The former strategy encourages natural erosion and sedimentation processes to rejuvenate riparian forests in regulated river systems. The latter strategy utilizes nature to reinforce nature, as well as increase flood protection, and economic or social values. For example, in the Netherlands, river dikes and seacoast areas are covered with species rich, natural grassland to protect these man-made constructions from erosion processes during high water levels (Fliervoet, 1999; Sprangers, 1999).

1.2 AIM OF THE THESIS

The aim of the present thesis is to analyze the complexity of the current collaborative, cross-sectoral interactions between governmental and non-governmental actors with respect to the maintenance of Dutch floodplains in order to increase the understanding of barriers and opportunities in collaborative governance. By applying the theory of framing, I explore and describe underlying issues, relationships and process frames held by stakeholders in case studies within diverse collaborative settings. The case studies focus on participants and organizations involved in floodplain management, especially with regard to maintaining the floodplains of the Waal river. Firstly, this research attempts to unravel the complexity of sustaining collaborative initiatives in the maintenance phase of river basin management. Secondly, barriers for collaboration based on the conflicting frames and interests of stakeholders with respect to maintaining multi-functional floodplains are identified. These insights may be used by practitioners, policy makers and scientists to understand and identify barriers, and stimulate collaborative initiatives in floodplain management. Finally, the conclusions of this research are used to make recommendations for policy and practice aimed at improving and enhancing collaborative governance approaches and ultimately realizing effective integrated river basin management.

1.3 THEORY OF FRAMING

I will use the theory of framing to explore the above questions with regard to sustainable collaborative approaches for maintaining multi-functional floodplains. Framing theories are used in a wide range of disciplines and *"generally focused on studying the various ways in which people strategically make sense of reality and how they add meaning to ambiguous and complex situations"* (Van den Brink, 2009, p. 35). The theory of framing has been used in research domains, such as environmental conflicts (Lewicki et al., 2003), sociology (Benford and Snow, 2000), and negotiation (Putnam and Holmer, 1992). This thesis uses the theory of framing developed in the domain of multi-actor collaboration (Dewulf et al., 2011; Gray, 1989; Hardy et al., 2005). During a collaborative process, stakeholders may bring different frames to the table, because they tend to frame issues or the problem at hand in very different ways (Dewulf et al., 2007). A frame refers to how people think about or perceive something, in other words it can be considered as a sense-making device (Weick, 1995).

Gray (2004) showed that conflicting or different underlying visions often hinder stakeholder efforts in finding common ground and thus form an obstacle for shared understanding and collaboration. Therefore, many studies have emphasized the importance of different perceptions, interpretations or frames in collaborative settings (Ansell and Gash, 2008; Lejano and Ingram, 2009; Termeer, 2009; Van Buuren, 2009; Dewulf, 2011).

In a case study of collaborative water governance in Ecuador, Dewulf et al. (2011) showed how diverse frames in the problem domain resulted in frame fragmentation. For example, sedimentation

processes in the river were seen as a source of income among sand miners, but framed as a problem by the representative of the water power plant. Therefore, management interventions could be framed as reducing the sediment in the river or enhancing sediment processes. Additionally, stakeholders may have different interpretations of the main problems, what is at stake and goal prioritization, leading to potential uncertainty (Van der Keur et al., 2008). Stakeholders may also hold frames about themselves, others and relationships (Dewulf et al., 2009). Stakeholders derive relationship frames during process evaluation, especially with respect to the development of mutual trust, and an assessment of public and private responsibilities in relation to practical maintenance. Additionally, stakeholders frame the interaction process that occurs within the stakeholder group during conflict that defines, for example, how conflicts should be managed (Lewicki et al., 2003). Overall, "conflict may not be resolved if frames are ignored and reframing is lacking" (Mostert et al., 2008, p. 302). In summary, the theory of framing shows that stakeholders may hold frames relating to issues, relationships and processes (Figure 1.3).

1.4 METHODOLOGY

In this research, case studies are used to explore stakeholder's frames and to describe the complexity of collaboration within floodplain management. Case studies can be used, for example, to develop theory, evaluate programs, and develop interventions. Moreover, case study analyses provide opportunities for researchers to study complex phenomena, such as collaborative governance, within their contexts (Baxter and Jack, 2008). The use of case studies has many advantages. They help researchers familiarize themselves with the basic issues, setting and concerns. They help disentangle complex social processes and cause-effect relationships temporarily and spatially. A case study analysis can help researchers elaborate an integral collaborative process and allow the incorporation of multiple perspectives or visions (Lawrence Neuman, 2014). According to Lawerence Neuman (2014, p. 42) *"case studies have a detailed focus but tell a larger story"*. In this research, cases studies describing collaborative processes occurring with respect to the maintenance of multi-functional floodplains in the flood-prone Netherlands are presented. These collaborative processes take place within the larger context of integrated river basin management.

Case study analysis permits the use of qualitative, as well as quantitative, research methods. During this research, qualitative research methods were applied that mainly involved conducting interviews, participant observation, and the analysis of video recordings of meetings. Semi-structured interview guides were used during interviews to ensure that the same topics were discussed with the stakeholders, while individual experiences and frames were allowed to emerge (Patton, 1990). Qualitative approaches are suitable methods for the identification of in-depth and detailed information about stakeholder's frames and for the evaluation of collaborative processes.

A quantitative research method based on a survey was used to explore the existing collaborative relationships with regard to floodplain management (see Chapter 4). The survey data was used to

perform a social network analysis. The use of qualitative and quantitative approaches enables the researcher to explore and describe differences within and between cases and to develop or extend concepts for further learning.

1.5 OUTLINE

This thesis consists of five research chapters and closes with a synthesis. Chapter 2 and 3 explore stakeholder's vision and issue frames with respect to collaborative objectives, structures and strategies. Chapter 4 focuses on the existing cross-sectoral relationships between governmental and non-governmental actors. Chapter 5 describes how stakeholders evaluate the collaborative processes involved in maintaining multi-functional floodplains. Chapter 6 investigates a new collaborative strategy based on a joint planning approach. Chapter 7 synthesizes the overall findings of the separate studies with regard to collectively maintaining multi-functional floodplains.

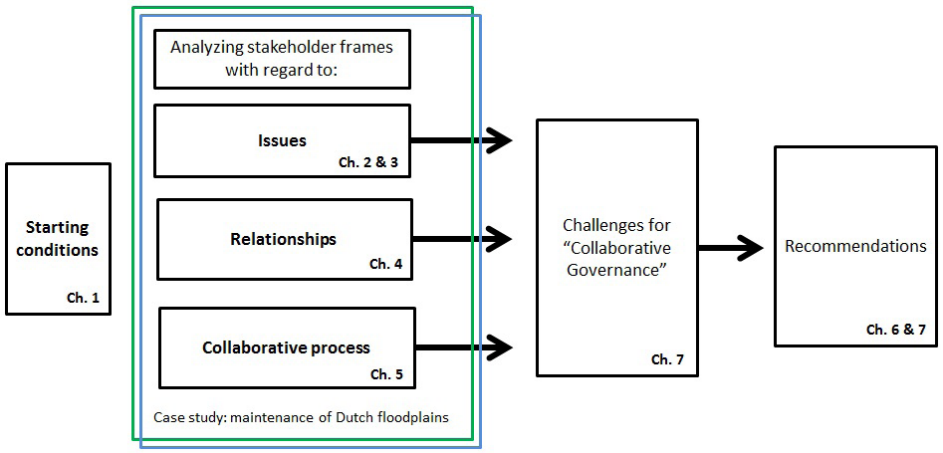

Figure 1.3 | Thesis framework.

1.5.1 Chapter 2: Combining safety and nature: a multi-stakeholder perspective on integrated floodplain management

In collaborative governance, the variety of frames that stakeholders bring to the discussion sets an important challenge. This chapter addresses how issues, especially with regard to maintaining flood protection and nature goals in floodplains, are framed by different stakeholders. The chapter explores stakeholder's frames according to five themes:

1. Visions of floodplain management.
2. Collaboration in floodplain management.
3. Visions of nature and definition of "self-regulating" nature.

4. Realization of Natura2000 goals in floodplains.
5. Feasibility of the strategy Cyclic Floodplain Rejuvenation.

1.5.2 Chapter 3: From implementation towards maintenance: sustaining collaborative initiatives for integrated floodplain management in the Netherlands

Collaborative governance has been introduced in the planning and implementation phases of river basin management, but has not yet reached the maintenance phase. In anticipation of this, the current chapter describes the challenge of finding common ground for the continuation of collaboration in the maintenance phase. To sustain collaboration, it is essential to define common floodplain management objectives clearly, including organizational structures. Therefore, this chapter focused on the following research question: How do diverse stakeholders frame collaborative objectives and associated collaborative membership structures in an interactive setting?

1.5.3 Chapter 4: Analyzing collaborative governance through social network analysis: a case study of river basin management along the Waal River in The Netherlands

Collaborative governance is characterized by complex collaborative relationships between various actors and sectors on multiple levels. Here, we ask how connected the water and nature sectors are with respect to floodplain maintenance. This chapter explores the current collaborative ties between organizations involved in floodplain management in order to gain insight into the degree of fragmentation or integration in collaborative management. The following research questions are addressed using social network analysis:

- Which actors are involved and what are the collaborative relationships between these actors that ensure flood protection (blue network) and/or fulfill nature objectives (green network)?
- Which actors play a coordinating or bridging role?
- What is the role of governmental versus non-governmental organizations in both networks?

1.5.4 Chapter 5: A stakeholder's evaluation of collaborative processes for maintaining multi-functional floodplains: a Dutch case study

Building upon chapter 3, this chapter describes and analyzes an unsuccessful regional case study in which no collaborative agreements to maintain floodplains were achieved. This case study enables us to understand interactions between the collaborative processes on the organizational and action levels. Regional stakeholder's frames were examined with respect to the following research questions:

- How do stakeholders reflect on their incentives, the collaborative process itself, and the intermediate outcomes resulting from the processes of the Coordination Council and the Stewardship?
- Which lessons are learned among stakeholders with respect to both collaboration processes and their interdependency?

- How do stakeholders allocate public and private responsibilities for maintenance tasks and how will this affect future collaborative governance?

Answering these questions leads to a deeper understanding of the present challenges to the continuity of collaborative governance in the maintenance phase of river basin management.

1.5.5 Chapter 6: Towards a Joint Maintenance Approach for floodplain management in the Netherlands: tensions and possibilities

This chapter describes the challenge of adapting working methods to strengthen collaborative floodplain management. The chapter adapts the effective elements of the Joint Planning Approach, used in past river rehabilitations programs, to the maintenance phase of river basin management. This chapter explores the following research questions with the help of three Dutch case studies that contrast mono- and multi-functional maintenance in floodplain areas:

- Which lessons can be learned from past multi-purpose river rehabilitation programs to facilitate ongoing and future collaboration with respect to the maintenance of multi-functional floodplains?
- (How) can joint planning as a working methodology strengthen collaborative processes in the maintenance of multi-functional floodplains?

1.5.6 Chapter 7: Synthesis

Chapter 7 synthesizes the overall findings of chapters two to six. The main barriers for collaboration are discussed. Secondly, this chapter addresses recommendations for future research, as well as societal recommendations, for effective collaborative governance aimed at maintaining multi-functional floodplains.

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CHAPTER 2

Combining safety and nature: a multi-stakeholder perspective on integrated floodplain management

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ABSTRACT

In The Netherlands, river basin management strategies and land use of floodplains have changed drastically over the last two decades. Due to an integrated and participatory planning style, many agricultural fields in floodplains were transformed to nature. The idea of *"self-regulating nature"* in the floodplains and policies such as Room for the River and *WaalWeelde* created more multi-functional and natural floodplains. In this way, during the planning phase, win-win situations were created between flood protection and nature. It was only later that obstacles occurred with regard to the maintenance of floodplains, mainly because of different perspectives of the stakeholders on how to reconcile flood protection and nature. Therefore this chapter focuses on the opinions of persons involved with "future" floodplain management strategies, which have been divided into five themes:

- visions of floodplain management;
- collaborators in floodplain management;
- visions of nature and *self-regulating nature;*
- realization of Natura2000 goals in floodplains;
- feasibility of the Cyclic Floodplain Rejuvenation (CFR) strategy.

We interviewed various persons involved in river and nature management along the Waal River. Based on our findings, it is concluded that an integrated planning approach has not been incorporated into the maintenance strategies and programs and, as a result, new, innovative management strategies such as CFR are proving to be incompatible with *"static"* regulations such as Natura2000's conservation goals and flood protection norms. However, by exploring the responders' visions of nature, we found that the majority of them preferred a *dynamic* vision of floodplains and, for this reason, they have advocated for more flexibility in current policies related to river and nature management. Additionally, the respondents emphasized the importance of multi-stakeholder collaboration to realize the goal of cost-efficient floodplain management.

2.1 INTRODUCTION

River basin management strategies and land use of floodplains, especially those in industrialized countries, have changed considerably over the last two decades (Jacobs and Buijs, 2011; Pahl-Wostl, 2006; Sparks 2010). One of the most pronounced changes is related to the increased importance of a sound ecological status for the fluvial system. This focus on nature rehabilitation and the trade-off with flood protection demanded for an integrated planning and management approach. As a result the floodplains were changed to multi-functional riverine landscapes (Pahl-Wostl, 2006; Van Stokkom et al., 2005), which increased complexity regarding management (e.g. Dufour and Piégay, 2009), perceptions (e.g. Jähnig et al., 2011) and institutional arrangements (Wiering and Arts, 2006) of these multi-functional floodplains. In Europe, this is most evident in the Rhine river basin (Havinga and Smits, 2000) and also visible in The Netherlands.

In The Netherlands, the so-called "Plan Stork" (De Bruin et al., 1987) has brought the aims of nature rehabilitation and flood protection closer together. Plan Stork elegantly focused attention on the long-forgotten biodiversity of the floodplains as it has been erased from man's recollection as a result of one-sided agricultural use of the floodplains during the last few centuries.

Based on historical studies and international references to natural (unregulated) river systems, the authors stated that the original fluvial-related biodiversity would return as soon as

A) the agricultural land use of the floodplains ended;
B) more room was given to natural erosion and sedimentation processes;
C) large herbivores were introduced into the floodplains.

This vision of "*self-regulating nature*" (Stanford et al., 1996; Ward et al., 2001) became a source of information for the Dutch ecological rehabilitation programs of the Rhine branches and Meuse River (Buijs, 2009). In the end, 42 percent of Dutch floodplains will be transformed to a *self-regulating nature* (Postma et al., 1996) within the context of hampered riverine processes (hampered by regulation), and *self-regulating nature* reaches the boundary conditions set by flood protection and navigation conditions (Stanford et al., 1996). Also, fueled by such European policy guidelines as the European Water Framework Directive and Natura2000 (Mostert, 2003), more and more agricultural land in the floodplains was bought by the national government and handed over to nature management organizations (Van Heezik, 2006; Wiering and Van de Bilt, 2006).

During this period (1987-1995), there was close cooperation between three ministries: the (formerly called) Ministry of Agriculture, Nature, and Fisheries[1]; the Ministry of Housing, Spatial Planning,

1 In 2003, the Ministry changed its name to Ministry of Agriculture, Nature, and Food Quality. Since 2010, the Ministry has been combined with the Ministry of Economic Affairs and is called the Ministry of Economic affairs, Agriculture, and Innovation.

and the Environment; and the Ministry of Transport, Public Works, and Water Management[2]. Apart from a spectacular increase in biodiversity along the Dutch rivers, new economic perspectives related to ecotourism also resulted from this land use transformation to more natural and multi-functional floodplains (Kurstjens and Peters, 2012).

Successful cooperation between the three ministries resulted in the transformation of a large area of agricultural land to a *self-regulating nature* that changed after the floods of 1993 and 1995 (Van Heezik, 2006). Although the declaration of Arles (Anonymous, 1995) — in which Rhine riparian states participated — has increased the international awareness of the important role nature plays in sustainable flood protection, The Netherlands, being the most downstream country, realized that increasing the water discharge capacity was the primary way to maintain the agreed flood protection level.

Based on this awareness, the "Room for the River" program was launched in 2006, and resulted in a comprehensive package of measures intended to increase the water discharge capacity of the Dutch river systems (Anonymous, 2006). Although the main aim was still flood protection, this new planning and policy tried to stimulate so-called win-win situations; i.e. approaches that would generate positive returns in different domains: primarily in the domain of flood protection, but also in the domains of landscape development and economic profit (Smits et al., 2000).

Again, this was an almost revolutionary change and resulted, for instance, in the Waal region (the Waal River is the main branch of the Rhine in The Netherlands), in a multi-player and multi-level process, and in the creation of more multi-functional river landscapes.

2.1.1 New participant coalitions

The integrated approach was not confined to the level of goal setting (i.e. the idea of combining flood protection, nature, and economics), but was also visible on the level of participant collaboration, which can be observed in other countries as well (Junker et al., 2007). From 2005 onwards, stakeholder participation and bottom-up approaches have been the usual tools with which to involve participants around the Waal River and to include the construction of new coalitions between stakeholders. In this context, in 2006, the *WaalWeelde* program launched an initiative by the University of Nijmegen (later adopted by the provincial government of Gelderland) to connect public and private entities in order to make Waal area safer, more natural, and economically stronger (Willems, 2009).

This new, integrated, multi-player approach was very successful in early planning and implementation phases around the Waal River (Smits, 2009). It was only later that some obstacles occurred; these

2 Since 2010, the Ministry of Housing, Spatial Planning, and the Environment and the Ministry of Transport, Public Works, and Water Management have been combined in the Ministry of Infrastructure and Environment.

were caused by issues regarding the maintenance and management of the newly constructed multi-functional riverine landscapes.

2.1.2 New emerging obstacles

In 2007, more pressure was put on the flood protection goals due to the results of the "*Veerman*" commission (Deltacommissie, 2008) in which experts urged that the new approach should also be adapted to include climate change. This implied an upgrading of the requirements with regard to protection against river flooding. It was predicted that the Rhine branches, including the Waal River, should be able to cope with 18.000 cubic meters of water per second instead of 16.000 m^3/s.

Today, a second obstacle is the national government's decreasing river and nature management budgets. As a result, more efficient management will be needed. Thirdly, for the large-scale riparian ecosystem rehabilitation, the *self-regulating nature* approach appeared to result in an increase of forested floodplain area (Geerling et al., 2008). The concern arose, especially among water managers, that this riparian vegetation would eventually reduce the water discharge capacity of the river systems. This resulted in the so-called *nature-safety dilemma* (Vreugdenhil, 2010; Wiering and Van de Bilt, 2006). Apparently, it was very difficult to reconcile the *self-regulating nature* objectives with the (updated) flood protection goals. The nature-safety dilemma is closely related to the debate on river restoration success. Different perspectives define success or failure of restoration measures (Jähnig et al., 2011). To understand rivers and floodplains, a variety of dimensions are essential to explore (Boon, 1998; Lenders and Knippenberg, 2005), such as temporal dimensions (e.g. historical biodiversity conditions) and social dimensions (e.g. the four representations on the equilibrium of nature (Figure 2.2)). So, the question is whether the underlying visions of nature held by the stakeholders involved are as difficult to reconcile as these policy goals are.

The Program Direction Room for the River (PDR), the main board responsible for implementing the Room for the River program, responded with a top-down solution, an approach that strongly contradicted the multi-level and multi-player approaches previously adopted, as for instance in the above-mentioned *WaalWeelde* program. This new solution was called *Stroomlijn* (Streamline) (Van Soest, 2008), a name as telling as "Room for the River" was. It called for the flood risk to be reduced to a single, conceivable, and manageable physical problem, solvable by removing vegetation in the floodplains as had been done so successfully before. In fact, as it had been done since the second half of the 19th century when the floodplains were used for agricultural purposes instead of an ecological function (Van Heezik, 2006).

The PDR, however, did not go that far back for their points of reference. They only referred to their reference state in 1997, one that was not far removed in time, but nevertheless, a period before the start of the new Room for the River policy, and before the transition of agricultural use to nature rehabilitation. This reference-based strategy should be replaced by an objective based strategy according to Dufour and Piégay (2009), because dynamic river systems make it impossible to return to a previous state.

The Streamline solution focused only on flood protection using strict norms and inflexible approaches an approach that is clearly at odds with earlier ones such as the *WaalWeelde* program or Plan Stork. The question then arises as to whether this solution of the PDR will end up dissolving the cooperative coalitions of stakeholders that until recently worked closely together to develop and implement successful, integrated floodplain projects. Because, at the same time (2008), the Ministry of Agriculture, Nature, and Food Quality[3] had already classified the "new" nature in the floodplains as Natura2000 — the European network of protected sites — making it impossible to remove this "new" nature.

This Natura2000 designation by the Ministry was completely at odds with the selected strategy of the PDR, and made it a very complex matter to implement the Streamline project. All the more so because many nature organizations, responsible for daily maintenance, support the approach of the Ministry. This inevitably complicates efforts to combine flood protection and nature objectives in floodplains.

2.1.3 Cyclic Floodplain Rejuvenation

In an attempt to solve this nature-safety dilemma, and also in collaboration with water and nature managers (Peters et al., 2006), a new floodplain management strategy called "Cyclic Floodplain Rejuvenation" (CFR) was launched (Duel et al., 2001; Smits et al., 2000) and later elaborated upon by scientists (Baptist et al., 2004). The core of CFR strategy is to mimic natural erosion and sedimentation processes and so rejuvenate floodplains and riparian forests in regulated river systems.

In natural, unregulated lowland river systems (not found in The Netherlands) regulatory works are absent, leaving riparian forests to gradually "choke" the river during periods of low water discharge conditions. During high water discharges (floods) the river breaks through the natural river banks, demolishing parts of the existing forests and creating new by-passes (Geerling, 2008). These natural events maintain the water discharge capacity of the involved river system and simultaneously locally "rejuvenate" the geomorphological and vegetation succession, resulting in a wide variety of niches and biodiversity.

In The Netherlands, river regulation of the Rhine branches was started during the late 18th century. From that period on the goal was to improve navigation (deep and wide river bed) and flood protection (fast flowing river and low hydraulic resistance of the floodplains) (Van Heezik, 2006). For these reasons, uncontrolled rejuvenation processes of riparian forests can no longer be allowed in densely populated areas such as The Netherlands. However, by mimicking the natural rejuvenation processes through carefully planning, clear cutting, and designing side-channels at certain locations, a (controlled) rejuvenation process can be realized — even along the highly regulated Rhine branches — without reducing the flood protection level. Of course, after such a CFR intervention, the succession of morphology and vegetation will resume so that after a certain period,

3 See footnote 1

the controlled rejuvenation process must be repeated, thus giving the floodplain management strategy a cyclic character.

CFR, as a novel management strategy, has been tested at two locations along the Waal River (Figure 2.1). Based on these experiments, CFR appears to be a management strategy that could have promising possibilities to combine flood protection and nature rehabilitation goals in floodplains, especially in Natura2000 target areas.

However, there are different perspectives among the participants on how to reconcile ecological, social and economic objectives with flood protection (Dufour and Piégay, 2009; Jähnig et al., 2011) leading to different opinions about CFR and other possible management strategies. Therefore the objective of this chapter is to explore the actors' opinions, visions and values, regarding the maintenance of nature and flood protection in floodplains. We have done this by interviewing the various participants involved in river and floodplain management along the Waal River, and by focusing on five themes that frequently emerge in the discussion of floodplain management:

1. Visions of floodplain management.
2. Participant collaboration in floodplain management.
3. Visions of nature and definition of *self-regulating nature*.
4. Realization of Natura2000 goals in floodplains.
5. Feasibility of the Cyclic Floodplain Rejuvenation (CFR) strategy.

2.2 METHODS

Our investigation is based on a qualitative research method combined with a short questionnaire. Face-to-face interviews were held using a semi-structured interview guide. In addition, the short questionnaire was filled in by the interviewees to get more information and occasionally to probe the outcomes of the interviews.

A qualitative approach is well-suited to gather insight into motivations, perceptions, wishes, and needs of participants (Erlandson et al., 1993). It gives the interviewer an opportunity to probe for motivations and explanations, and creates space for innovative ideas or perceptions. In that way, both an integrated image and detailed knowledge can be obtained (Rubin and Rubin, 2005).

2.2.1 Study area and respondents

The project area is the same as that of the *WaalWeelde* program, including the floodplains near the river Waal — from the municipality of Lobith to the municipality of Gorinchem (a distance of approximately 80 kilometers) (Figure 2.1).

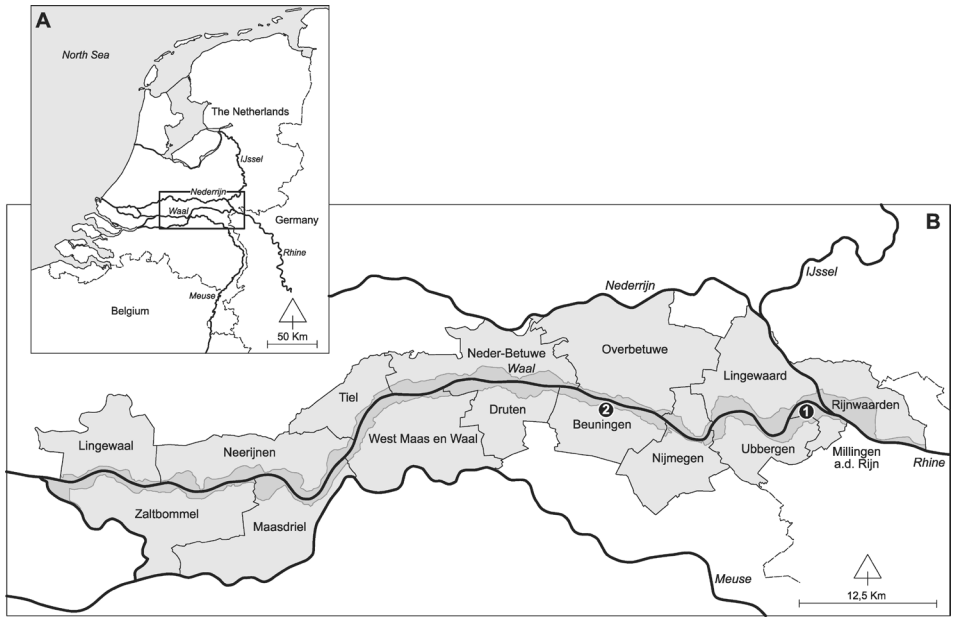


Figure 2.1 | Study area: (A) location of project area in The Netherlands; project area of *WaalWeelde* (B); the locations of the municipalities (light gray); and the floodplain area (dark gray); with the locations of the *Millingerwaard* (1), and *Ewijkse plaat* (2) where cyclic floodplain rejuvenation has been applied.

In total, seventeen respondents were interviewed, in each case by one interviewer; i.e. the first author of this article. The respondents were representatives of thirteen different organizations (Table 2.1). In this paper, respondents were coded with the abbreviations of the organization (Table 2.1). Nine respondents were interviewed individually. During the other interviews (four) there were two respondents present. In all four cases, this was a specific request of the respondents themselves. In these cases, the same interview guide was used and respondents were individually addressed especially by questions about their personal opinions, such as their visions of nature. All respondents were men between 37 and 63 years old (average of 53 years).

Respondents were selected using the following criteria: (1) the respondents are active in the project area of *WaalWeelde,* and (2) have a high position in their organization, such as director or manager. With this selection, we ensured that only influential players with decision power were chosen.

Respondents were invited to participate in an invitation letter written by the project manager of *WaalWeelde* and the interviewer. Organizations and possible participants were collected from the members of the Steering Committee and the advisory board of *WaalWeelde*. We did not interview representatives from municipalities, agricultural organizations, and the water board, even though they are currently members of the advisory board of *WaalWeelde*. Water boards are charged with managing dikes, instead of floodplains, and are, therefore, not relevant for this chapter. Municipalities and agricultural organizations were excluded because there were too many to include in this study.

Table 2.1 | List of respondents, the abbreviations are used to indicated different respondents.

Interview number	Abbreviations	Organization	Profession
1	FODI	Federation of sand, gravel, clay and limestone winning industries	General Secretary
2	Prov1	Provincial government of Gelderland	Program manager Natura2000
	Prov2	Provincial government of Gelderland	Project leader Natura2000 (of the Rhine Branches) management plan
3	GMF	Federation for nature and environment of Gelderland	Policy advisor water and nature
4	KvK	Chamber of Commerce	Policy advisor
5	DLG	Government Service for Land and Water Management	Process manager
6	Ark	ARK Foundation	Director
7	RWS	Directorate for Public Works and Water Management	Senior advisor "Room for the River" (region east)
8	SBB1	Dutch State Forestry Service	Region director (region east)
	SBB2	Dutch State Forestry Service	Process manager (deputy director) (region east)
9	IenM1	Ministry of Infrastructure and the Environment	Head of the department of water safety
	IenM2	Ministry of Infrastructure and the Environment	Senior policy advisor
10	DP	Dutch Delta Program Rivers	River basin manager for the Waal, Rhine and Meuse estuary
11	ELI1	Ministry of Economic Affairs, Agriculture and Innovation	Member of management Regional Affairs (region east)
	ELI2	Ministry of Economic Affairs, Agriculture and Innovation	Senior policy advisor at management Regional Affairs (region east) and program manager Rivers.
12	rPDR	Program Direction Room for the River	Head of the department knowledge
13	GL	Foundation of Gelderse landscapes and castles	Region manager for the River landscape and south Veluwe

2.2.2 Interview structure

The interviews were held at the offices of the respondents and lasted approximately one hour (between 50 and 90 minutes). The respondents were interviewed between April 4 and June 10, 2011. The interviews were semi-structured, with open and closed questions and were divided into three parts: (1) visions of floodplain management and nature, (2) collaboration and Natura2000

management plans, and (3) possible solutions. Social characteristics addressed were age, gender, function, and job history. This was done for all respondents with the exception of respondent IenM2, due to time limits.

Visions of floodplain management and nature

Each respondent was asked to give his personal description of *self-regulating nature*[4]; i.e. on processes to change the floodplains into more natural river landscapes. After that, four images representing four different perspectives on the equilibrium of nature were shown and explained (Figure 2.2).

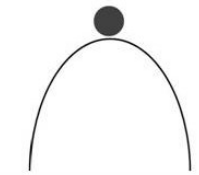
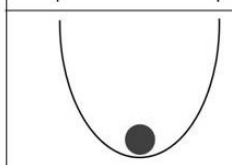
Visual representation	Balance	Description
	Indifferent	nature can be seen as indifferent to human actions
	Buffered	humans do affect nature but irreversible effects will only occur when certain thresholds are breached
	Unstable	the effect of humans on the balance in nature is so severe that it prohibits it from returning to its initial state
	Stable	nature will return to its original state, independent of the influences of humans

Figure 2.2 | Representations and descriptions of balance in nature based on the description in (Lenders et al., 1997).

The respondent had to choose one out of the four representations. The assumption was that the respondent who indicated nature as being *Indifferent* or as *Stable* would be more willing to intervene, or to accept large-scale interventions in nature. For these respondents, intensive maintenance or exploitation of nature would not be a problem: nature would adopt (*Indifferent*) or would be resistant to human activities (*Stable*). Respondents who selected the options *Buffered* or *Unstable* were assumed to be less willing to intervene or accept interventions: extensive human activities would be in the interest of nature. Therefore, these supporters of the notion of *Buffered* or *Unstable* would be more interested in the approach of *self-regulating nature*.

4 *"Procesnatuur"* in Dutch.

Collaboration and Natura2000 management plans

The perspective on participant collaboration was investigated in two different ways: first, by asking them to mention fruitful partnerships in *WaalWeelde*; and secondly, by discussing their cooperation and the roll they played in the process of developing Natura2000 management plans for the Rhine branches. These plans will be written by the provincial government of Gelderland in close cooperation with the Directorate for Public Works and Water Management and the Ministry of Economic affairs, Agriculture, and Innovation.

Possible solutions

To explore the participants' opinions about institutional change and to test their willingness to cooperate, the interviewer introduced a *stewardship council*[5] as an alternative institutional arrangement for Dutch floodplain management. This council could be seen as an independent (financially) floodplain organization within a river section (Goverde et al., 2009).

A last approach to explore possible solutions for the tension between flood protection and nature goals was the new management strategy, CFR. The respondents were asked for their understanding of and opinion about CFR.

2.2.3 Questionnaire structure

The short and additional questionnaire was used to probe visions of nature quantitatively (theme 3), and consisted, respectively, of (1) images of human-nature relationship and (2) images of nature landscapes.

Images of human-nature relationship

The respondents' ideas on the relationship between humans and nature were checked by using the statements of the Human and Nature scale developed by De Groot and Van den Born (2003) and Van den Born (2006, 2007), and elaborated on further by De Groot (2012). This method includes statements based on four classifications of human-nature relationships: Mastery over nature, Stewardship of nature, Partnership with nature, and Participant in nature (Table 2.2). In this chapter, each category is represented by three statements. Respondents could react to the statements on a five-point scale: *strongly disagree/ disagree / neutral / agree / strongly agree*.

5 "*Waardschap*" in Dutch.

Table 2.2 | Description of the four classifications of the human-nature relationship based on Van den Born (2007), De Groot (2012) and Verbrugge et al. (2013).

Human-nature relationship	Description
Mastery over nature	Humans stand above nature and are allowed to maximize exploitation of nature for benefits for human society as detrimental effects of human actions can easily be overcome by economic growth and technology.
Stewardship of nature	Humans stand above nature but have a responsibility to take care of nature towards higher powers (e.g.) God or future generations.
Partnership with nature	An equal relationship exists between humans and nature who work together in a dynamic process of interaction and mutual development.
Participant in nature	Humans are part of nature, not just biologically, but with a sense of (spiritual) belonging

Images of nature landscapes

To explore basic landscape preferences, the respondents had to choose one out of four descriptions of natural landscapes: A) a well-ordered landscape made by and for people; B) a varied, park-like landscape; C) untamed nature with which one may have many interactions; or D) a landscape in which one may experience the greatness and forces of nature. These descriptions are based on De Groot (1999) and De Groot and Van den Born (2003).

2.2.4 Data analysis

All interviews were recorded and transcribed for the purpose of analyzing the data. A qualitative data analysis of coding and memoing, according to Miles and Huberman (1984) was used. Firstly, the textual data was coded, an abbreviation or symbol applied to a segment of words, according to the five research themes. A second step involved labeling or coding within these themes; e.g. types of associations of Cyclic Floodplain Rejuvenation. The third step was the memoing phase: many tables and profile memos were created to structure and analyze the respondents' answers or opinions per theme and per respondent.

2.3 RESULTS

The results from the interviews and questionnaire are structured according to the five main themes of our study: (1) general vision of floodplain management, (2) participant collaboration, (3) visions of nature and definition of *self-regulating nature*, (4) development of Natura2000 management plans, and (5) Cyclic Floodplain Rejuvenation (CFR) in practice. The full names of the abbreviations of the respondents are presented in table 2.1.

2.3.1 Visions of floodplain management

All respondents agree that flood protection is the primary goal in the planning of floodplain management, and other goals such as nature, economics, and recreation are secondary. In practice,

however, it appears there is no consensus on the vision of floodplain maintenance. *"Today, every organization argues from its own point of reference; many different frames are used to describe how floodplains should look. For example, water managers see it [maintenance of vegetation] as "overdue maintenance," and we [nature managers] see it as excellent management"* (SBB2). The respondents argue from their own visions; this is also acknowledged by respondents ELI1, SBB1, DLG, IenM1, rPDR, FODI, and Prov1.

These visions and the accompanying interests (Table 2.3) appear to be the point of departure rather than the integrated vision of *WaalWeelde*. This vision is only mentioned by respondents Prov1 and Prov2, and secondarily by ELI1. The respondent Prov1 states that *"The Directorate for Public Works and Water Management and the Ministry of Infrastructure and Environment do not consider the landscape quality goals, so we do not have a shared vision."* At the same time, respondents ELI1, IenM1, and SBB2 feel their vision is most complementary to the vision of the provincial government of Gelderland.

Another unilateral vision of floodplain management is shown by respondent rPDR: *"We are a totally different organization in the field of floodplain management, because we only focus on flood protection."* According to the same respondent, *"the Natura2000 goals are our biggest obstruction."* Many other respondents refer to the formulated nature objectives as obstacles (i.e. IenM1, DLG, DP, FODI, KvK, Prov1, and RWS). For example, *"a more natural river landscape requires flexible river calculations, whereas the present calculations [flood protection norms] are very static"* (RWS). *"The Ministry of Economic Affairs, Agriculture, and Innovation is changing nature goals, and water managers such as the Directorate for Public Works and Water Management should pay for the improved nature targets"* (DP). This conflict is not only confined to flood protection and Natura2000 goals, but respondents KvK and FODI are also speaking about conflicts of interest regarding economic values and Natura2000 goals. These quotes show there is insufficient thought given to maintenance of floodplains in the planning and vision phase of the integrated approach. This is also visible in regulations; for instance, there is no law for poorly maintained floodplains (Prov1 and IenM1), nor is there an opportunity to use an integrated monitoring system for testing multi-functional plans regarding flood protection norms (SBB2).

Table 2.3 | The main organizational stakes of the respondents defined by the authors based on the interviews (**X** = main stake, x = secondary stake), DLG has no main stake (a neutral organization).

Respondent	Organizational stakes		
	Flood protection	Nature	Economics
FODI			X
Prov1 & 2	X	X	X
GMF		X	
KvK			X
DLG	x	x	x
ARK		X	
RWS	X		
SBB1 & 2		X	
IenM1 & 2	X		
DP	X	x	x
ELI1 & 2		X	x
rPDR	X		
GL		X	

2.3.2 Participant collaboration of floodplain management.

Respondents indicate that cooperation between the involved parties in floodplain management is not an obstacle. Many organizations report successful and productive partnerships. When shown a list of all other involved organizations, six respondents (SBB2, DLG, ELI1, ELI2, DP, rPDR) indicated they can work well with all the listed organizations. The State Forestry Service, Directorate for Public Works and Water Management, and the provincial government of Gelderland are mentioned several times by respondents and, therefore, seem to be good partners.

Respondent Prov1 refers immediately to the Directorate for Public Works and Water Management and the Government Service for Land and Water Management, *"because the role they play is complementary to ours"* (Prov1). Respondent RWS gives examples of successful cooperation with the State Forestry Service and the provincial government of Gelderland, while he sometimes finds it difficult to work with Government Service for Land and Water Management, due to a different work culture. *"We have a project approach instead of a process-based [participative] approach"* (RWS).

When asked to mention an organization where cooperation is difficult, respondents stated that they could work well with almost everyone. Respondent RWS was one of the few who could mention a less fruitful collaboration. He was critical of the role of the provincial government of Gelderland. *"They have many demands, but they do not show any willingness to act. They should take the lead."* (RWS). In general, the participants' coalitions in *WaalWeelde* are willing to cooperate.

2.3.3 Building a stewardship council

To find a suitable structure of cooperation for applying an integrated approach, the interviewer introduced a stewardship council[6] regarding floodplain management. Additionally, the idea of a stewardship council was created as a way to test respondents' willingness to accept institutional change. This idea raised many critical comments from the respondents. Six participants reacted immediately by saying that collective goals must be formulated before changing the institutional work-field of floodplain management (Prov1, DLG, SBB2, DP, ELI1, FODI). In other words: *"What does everybody want?"* (SSB2); *"We should pursue the same qualities"* (ELI1); *"The organizational structure follows the strategy, and not the other way around"* (ELI1). This shows again that respondents are of the opinion there is no integrated and shared vision of floodplain management.

Eight respondents rejected the idea or had strong doubts about creating a stewardship council (Prov1 &2, RWS, SBB2, IenM1 & 2, DP, ELI1). These respondents were all from governmental organizations. Arguments for rejecting a stewardship council included (1) apprehension about creating an additional public level, (2) concern that with too many organizations involved, people would play their own roles rather than work cooperatively, and (3) the fear that a stewardship demands a huge institutional change. Despite this rejection of a stewardship council, there is an urgency among the respondents for a different structure of cooperation. For example, respondent ELI1 explains *"that finding an efficient structure for participant collaboration is an assignment for the governmental organizations."* This requires more openness and transparency to society from the governmental organization according to respondent ELI1.

Six respondents felt that creating a stewardship council could have advantages (FODI, GMF, DLG, ARK, GL, ELI2). Some of these include *"the integration of management and development goals"* (FODI); *"the construction of one entity with one responsibility"* (rPDR, GL); *"the possibility to link fragmented properties"* (GL); and *"necessary for the concept of CFR"* (ELI2, DLG). Another advantage presented by the interviewer is the possibility to link different budgets for floodplain management. According to three respondents, this linkage is crucial for cost-efficient floodplain management (DLG, ARK, SBB2). Some of the other respondents (GMF, IenM1, rPDR) do not see this as an advantage. The risk of combining budgets is that there could be less money to spend, because Ministries will lower their estimated budgets for the next year (IenM1, rPDR). In response to the question of which organization should get the position of chairman in a new stewardship council, five different organizations were mentioned. No shared leader was found.

2.3.4 Visions of nature

In this paragraph, the authors show the results related to the respondents' visions of nature. We explored (1) representations of balance in nature, (2) image of human-nature relationship, (3) image of nature landscapes, and (4) definition of *self-regulating nature.*

6 A stewardship council could be seen as an independent (financially) floodplain organization within a river section, which differs from a stewardship of nature (following paragraph, *Visions of nature*).

Firstly, the four basic representations of balance in nature were shown and explained to the respondents. The majority of respondents (14 out of 16) chose a buffered model: humans do affect nature, but irreversible effects will only occur when certain thresholds are breached (Figure 2.3).

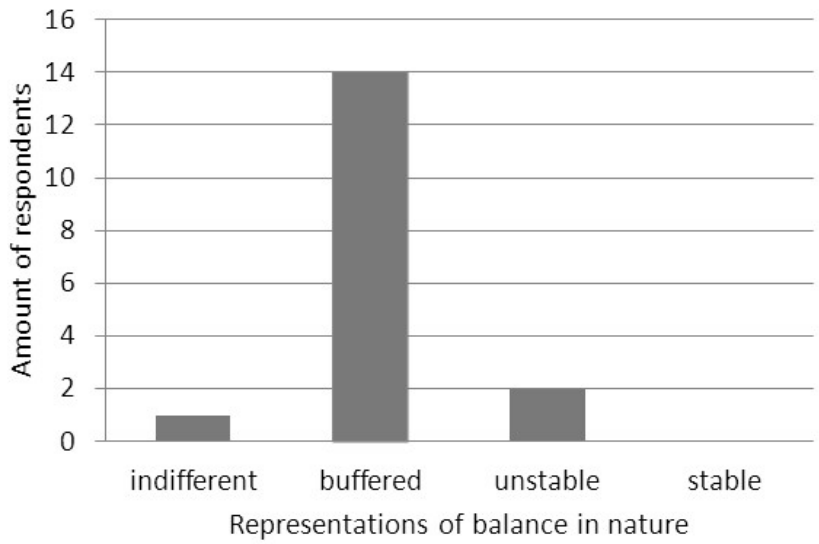


Figure 2.3 | Four representations of balance in nature, respectively indifferent, buffered, unstable and stable (Figure 2.2) (16 respondents; one respondent (DLG) could not choose between buffered or unstable).

Secondly, image of the *human-nature relationship* was probed by using a questionnaire. The majority of respondents (11 out of 16) rejected the idea of *mastery over nature* indicating that humans should not stand above nature. *Steward* and *participant* were the most preferred relationships between humans and nature with a mean of 4,04 (steward) and 4,13 (participant), compared to 2,60 (master) and 3,60 (partner) on a 1-5 scale from disagree to agree (see paragraph 2.3.1). This suggests that the respondents wanted to be part of nature (participant), but with the responsibility to take care of nature (steward).

Thirdly, the respondents were asked for their *landscape* preference. The landscape, in which one could experience the greatness and forces of nature (D), was chosen by the majority of the respondents (11 out of 16). A small group chose answer B: a varied, park-like landscape (rPDR, GL, Prov2, KvK), or answer C: untamed nature, with which one could have many interactions (SBB1 and DLG). None of the respondents preferred a well-ordered landscape (A) (Figure 2.4).

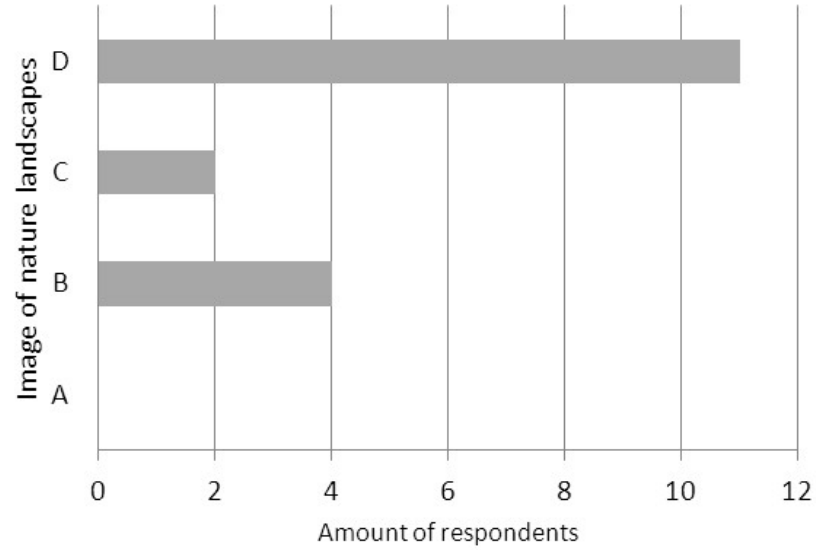


Figure 2.4 | Image of nature landscapes; A) a well-ordered landscape made by and for people; B) a varied, park-like landscape; C) untamed nature with which one may have many interactions; or D) a landscape in which one may experience the greatness and forces of nature (16 respondents; one respondent (DLG) could not choose between answer C or D).

Fourthly, the respondents' definition of *self-regulating nature* was explored. The provincial government of Gelderland stated: *"since Plan Stork, we have been making a shift from 'pattern-steered' nature [intensive maintained nature] or 'no nature' to self-regulating nature in floodplains"* (Prov1). The majority of the respondents (12 out of 17) defined it as developing nature with as little human intervention as possible. According to respondent SBB1: *"to me, self-regulating nature is about the courage of humans to do nothing."* Respondents RWS and SBB2 emphasized that nature development is always tied to some boundaries, e.g., the flood protection norms. Although some respondents preferred the term *dynamic nature*, instead of *self-regulating nature*, the majority (12 out of 17) gave a rather similar definition. Three respondents (KvK, IenM1, and IenM2) could not give a definition of *self-regulating nature*.

In short, the respondents had similar visions of nature. Simultaneously, the majority had the same notion of *self-regulating nature*. Although planning and managing floodplains is their daily occupation, the majority of water and nature managers (11 out of 16) preferred a landscape in which one could experience the greatness and forces of nature.

2.3.5 Realization of Natura2000 management goals in floodplains

The participants are involved in the Natura2000 management plans in different ways, either by being members of the advisory board, writing (provincial government), or implementing the plans. According to the provincial government of Gelderland: *"The aim of the plan is to secure and to realize Natura2000 goals [...] However, it is also important to do it in such a way that other functions in the floodplains are still possible, such as economic functions"* (Prov2). This aim seems to be a difficult challenge because the management plans are still not realized. Natura2000 goals were already mentioned as an obstacle by many respondents (IenM1, DLG, DP, FODI, KvK, Prov1, RWS, rPDR). The critics refer to the content and development process of the Natura2000 management plans. Two obstacles can be distinguished regarding the content. First, *"the plans only stress vegetation goals, and they are not sufficiently integrated with flood protection norms, financing, or organizational principles"* (DLG). The respondents refer to the concern that Natura2000 is considered to be the main function in the floodplains rather than one of the many functions a floodplain can serve. Therefore, some respondents complain about extra and unnecessary efforts that companies have to make when they want to increase company activities in the neighborhood of Natura2000 sites, (i.e. additional opening hours) (FODI, KvK). *"They [entrepreneurs] have to prove that their adjustments have no significant effect on Natura2000 objectives, this will decrease development opportunities"* (KvK).

Second, respondent rPDR noticed that the Natura2000 rules are especially focused on conservation, and are, therefore, too static or inflexible. This was also observed by respondents DLG, DP, IenM1, and RWS. Respondent GMF agrees that Natura2000 is a static instrument; however, in his opinion, this is an advantage because it tries to conserve as much as possible.

In relation to the development process, the following obstacles were found. According to respondents FODI and KvK, the meetings of the advisory board lack structure and leadership. Respondent FODI also remarked: *"Natura2000 has insufficient support in society."* The writing of the plan is described as a tiring, formal, and enduring process by many respondents. According to the respondents, there were three causes for this; (1) the government has made too many adjustments; (2) the process is bureaucratic; and (3) the focus is more on obstacles than on targets. The explanation of the provincial government of Gelderland was: *"It is a long-term process because, due to administrative and political pressures, the context and the rules were changed many times; there was unfamiliarity with Natura2000; and because it involved working together with many civil society organizations."* (Prov1). For the first time, the participants' cooperation in *WaalWeelde* seemed to be threatened regarding the maintenance of the floodplains.

2.3.6 Feasibility of Cyclic Floodplain Rejuvenation (CFR) strategy

In this paragraph, we explore the obstacles with regard to bringing CFR into practice. Several respondents do not have a clear image of CFR (e.g. IenM1 and GL), while others translate it into their own interests (7 out of 17). For example: "*We would like to create a situation where clay and sand extraction is a renewable instead of non-renewable resource*" (FODI). CFR was originally developed to manage *self-regulating nature* in regulated river systems; however, this was not recognized by

respondent KvK, who states that *"it is not developed for ecological values, but more for the control of costs and maintenance."*

A substantial number of respondents (10 out of 17) have sufficient knowledge about the concept of CFR. Respondent DLG explains it as follows: *"Cyclic Floodplain management is, in fact, choosing for interventions [rejuvenation], or doing nothing [succession] in a smart way in time and space to keep your total vegetation management under control. Whereby, flood protection and nature goals can be achieved."* CFR creates more space for nature, but at the same time, it increases the impact of the unpredictability and spontaneity of nature. It creates a more dynamic and natural-looking river landscape according to the stakeholders. The question is whether this strategy will solve the nature-safety dilemma.

Those respondents who have an adequate knowledge of CFR, differed on the idea of whether CFR is the solution for decreasing the tension between flood protection and nature. Six respondents consider CFR as a feasible solution. *"Yes, I think it is an interesting solution, where natural processes are used for our benefit"* (Prov1). *"CFR is a principal component. If you want a more natural river, that takes flood protection into account, automatically you need CFR"* (DLG). Respondent ELI1 sees the concept also as the very basis of their management approach; however, he also points out some uncertainties. *"We cannot trust this approach for the full hundred percent […] Nature does not always behave as you think it behaves"* (ELI1). That is why today's management concepts should be flexible enough to deal with the unpredictability of nature. Another advantage of using this concept is that it is less expensive due to using natural processes. *"We still have the tendency to solve problems from a civil engineering view instead of looking at what nature can do for us"* (ARK). Two respondents think that CFR is only a good solution if the concept is used for restoring old river branches (GL) or applied on a large scale (RWS).

Arguments for dismissing CFR as a solution included uncertainties relating to space limitations, static instruments, and responsibility issues. Respondents SBB1 and DP thought that while creating more space for the river was a solution, that did not necessarily mean that CFR had to be a part of it. *"The more space a river gets, the less risks and calamities you get"* (SBB1). According to respondent rPDR, *"CFR is not implemented in practice due to flood protection norms and Natura2000 rules. Both instruments are too static and are not congruent with CFR."*

Finally, floodplain management is executed by different organizations, which have different responsibilities and different stakes (Table 2.3). Respondent DLG discusses that we need different managers: those who are responsible for flood protection and nature goals, and those for implementing the strategy of CFR. In his opinion, this would result in another distribution of the current responsibility. In short: *"CFR demands flexibility, but it will give uncertainties"* (DLG).

2.4 DISCUSSION, CONCLUSIONS, AND IMPLICATIONS

2.4.1 Conclusions

The results show many obstacles regarding the five themes of our study. The multi-player and multi-level planning process of *WaalWeelde* and the Room for the River program focused on implementation rather than on maintenance strategies, so these strategies are neither clear nor widely accepted by the respondents.

The integrated floodplain management approach, especially as it combines flood protection and nature goals, resulted in more space for *self-regulating nature*. Those areas are dominated by natural processes and low maintenance interventions according to the respondents. This strategy resulted in more biodiversity and an increase of forested floodplain area.

From a water management perspective, this forestry vegetation should be reduced to meet the desirable and updated water discharge capacity of the river systems. Therefore, the Streamline program tries to remove the vegetation in the flow paths of the floodplain.

These conflicting maintenance strategies refer to the nature-safety dilemma, which was previously solved by the integrated planning approach. In other words, a shared vision on maintenance is needed; otherwise, it is very difficult to maintain ecological rehabilitation goals with the (updated) flood protection goals. For an integrated approach, the respondents need to combine their different perspectives on maintenance as the majority of them advocate for more flexibility in the river and nature policies.

To create and maintain this flexibility, a new management strategy called Cyclic Floodplain Rejuvenation (CFR) was developed. The respondents described many obstacles with regard to the efficient use and implementation of CFR. This "dynamic" tool is not compatible with the "static" Natura2000 regulations and flood protection norms; in addition, CFR needs to be implemented on a large area instead of one floodplain, because CFR interventions have an effect on multiple floodplains. This scaling problem is also discussed by Vreugdenhil et al. (2010), who stated that the lack of flexibility in scale use on the design of an innovation, such as CFR for floodplain management, leads to less effective solutions. For example, water and nature managers have different scale preferences. Therefore, the respondents refer to another distribution of responsibility and a different organizational structure in the field of floodplain management, as current institutional arrangements deal with nature and river management separately.

In practice, the current institutional arrangements do not obstruct collaboration between different sectors. In the case of *WaalWeelde,* the majority of organizations mentioned fruitful partnerships and showed their willingness to collaborate, which resulted in an integrated planning approach. However, the process of developing Natura2000 management shows that collaboration regarding the maintenance of multi-functional floodplains is difficult. Furthermore, the idea of constructing

a so-called *stewardship council* raised many concerns, especially in governmental organizations that found it too large an institutional change. Nevertheless, the respondents advocated for different and more efficient collaboration arrangements regarding maintenance of floodplains in which transparency to society and other institutions is important.

2.4.2 A dynamic vision of floodplains as basic principle for maintenance

In general, the respondents advocated for more consistency between their maintenance perspectives and flexibility in the policy regulations (Natura2000 and flood protection norms). The respondents' visions of nature fit well with the self-regulating nature approach. The majority of the respondents preferred a steward and participant image when asked for the ideal human-nature relationship. The idea that people are responsible for nature and are a part of nature is consistent with results from other studies (De Groot, 2012; Van den Born, 2006, 2008; Verbrugge et al., 2013).

Considering balance in nature, a strong preference for the buffered model assumes the respondents would be less willing to intervene or accept human interventions. Nature should be left to restore her own "mosaic patterns" by allowing more space for natural erosion and sedimentation processes, and by the introduction of large herbivores in the floodplains as proposed in Plan Stork (De Bruin et al., 1987). Additionally, when asked for their favorite landscape, respondents choose a landscape in which one could experience the greatness and forces of nature.

Despite the different disciplinary backgrounds of the respondents, we found a shared dynamic vision of floodplains that could be an important basic principle in solving the nature-safety dilemma. This dynamic vision fits well with the "flux of nature" perspective discussed by Ladle and Gillson (2009), who discussed a conceptual shift within environmental and social sciences from one that placed an emphasis on ecosystem stability and balance (balance of nature) to an acknowledgement of the importance of flux and change in the natural world (flux of nature). This has profound implications for the management of ecosystems such as floodplains, and also for the way conservation ecology and policy is communicated to the public.

The research shows that the public view of conservation science is still framed as being one of maintaining stability, harmony, and balance instead of one that is dynamic, non-linear, and complex (full of surprise) (Grumbine, 1997; Ladle and Gillson, 2009). Besides consideration of this communication aspect, Yaffee (1996) pointed out the difficulty of developing conservation goals for systems that are inherently dynamic. This difficulty was seen in the tiring and enduring process of developing Natura2000 management plans. To facilitate this process, Yaffee (1996) discussed the importance of human institutions; e.g., one of five most important tasks is to mobilize institutional change and innovation.

2.4.3 Implications: towards new alliances and governance models in floodplain management

The maintenance of multi-functional floodplains in *WaalWeelde* seems to be a challenge. The maintenance obstacles refer to multi-level (e.g. scale) and multi-stakeholder issues. This chapter shows that the maintenance vision held by the different respondents should be strengthened with the dynamic vision on floodplains. In practice, this might result in uncertainties and more flexibility in the policy regulations, and for example, a focus on ecological processes instead of single species management. Along these lines, the stakeholders advocated for a more integrated style of collaboration regarding maintenance. In Dutch water management, this shift is already being characterized as a transition (from a technocratic style towards an integral and participatory style), which is currently in the take-off stage and nearing the acceleration stage (Van der Brugge et al., 2005).

The issues regarding the maintenance of floodplains as discussed in this article might lead to new alliances and governance models for river management. Institutional change has also been studied by Wiering and Arts (2006), who discussed whether the Room for the River policy implies "deep" institutional change; e.g. in terms of emergence of new water institutions, power relations, and procedures, instead of an adaption strategy. These results also showed that it was too early to speak of "deep" institutional change in Dutch water management. Although, this research did not focus on institutional change, a deep motivation for institutional change appeared among the stakeholders.

Furthermore, the budget for river management of the national government is decreasing, so new government arrangements should also pursue innovations to lower the maintenance costs. For instance, the maintenance budgets for sedimentation and vegetation could be combined to simplify the implementation of CFR. Future studies should also explore suitable and cost-efficient collaboration structures or new government arrangements for floodplain management as well as the consequence of lower maintenance budgets. Some alternative institutional arrangements for Dutch floodplain management are listed by Vreugdenhil et al. (2008): existing institutions; expanding water boards, project bureau, stewardship council, and new regional governance. The two latter mentioned are combined in the definition of river foreland boards and discussed by Goverde et al. (2009).

The river foreland boards are also considered to be relatively autonomous new administrative entities with functional responsibilities in respect of a specific territory. The introduction of this type of organization is a reasonable idea when its targets are limited to implementation and management, and avoid policy-making in a relatively small territory. Goverde et al. (2009) considers river foreland boards less appropriate for solving highly complex integration issues.

The expected disadvantages are the enlargement of administrative density, competence struggles in the public sector, an increase in legal actions, and a further undermining of the trust and

commitment of citizens. However, these different ideas on institutional arrangements regarding floodplain management have never been tested in practice.

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CHAPTER 3

From implementation towards maintenance: sustaining collaborative initiatives for integrated floodplain management in the Netherlands

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ABSTRACT

Collaborative governance has been introduced in the planning and implementation phases of river management, but has not yet reached the maintenance phase. In anticipation of this, we explore how stakeholders shape collaborative initiatives aimed at maintaining multi-functional floodplains by analyzing their frames on collaboration objectives and membership structures. Our case study, shows how participants envisioned a shared governance structure, while no consensus was attained on the underlying collaborative objectives. Moreover, the envisioned structure revealed a tendency towards separation instead of integration, because participants abandoned the idea of public-private collaboration, which had previously been adopted in the planning and implementation phases.

3.1 INTRODUCTION

Over the last 20 years, an increasing number of collaborative and integrated approaches have been introduced in the management of natural resources, especially in river management (S. D. Hardy and Koontz, 2009; Huntjens et al., 2010; Leuvenet al., 2000; Lockwood et al., 2010; Margerum and Whitall, 2004). The diversity of river functions, such as flood safety, nature restoration and other potentially conflicting land usage (i.e. recreational and agricultural functions), as well as the introduction of diverse stakeholders to manage the rivers, led to a need for an integrative approach in river management. In this context, a number of researchers have identified a shift from hierarchical and highly institutionalized forms of government towards a more collaborative approach between public, private and societal actors ("Collaborative governance"; Ansell and Gash, 2008; Emerson et al., 2012; Meijerink and Huitema, 2014; Van Buuren et al., 2012). The collaborative planning and implementation processes led to a shift from the former one dimensional agricultural function towards multi-functional floodplains, that combine flood protection, nature restoration, the mining of sand and clay, recreation and agricultural (Pahl-Wostl, 2006). Additionally, these collaborative approaches led to the creation of multi-stakeholder platforms, such as river basin organizations, collaborative watershed partnerships, and "collaborative superagencies" (cf. Jaspers and Gupta, 2014; Pratt Miles, 2013; Sabatier et al., 2005 p. 7).

In the Netherlands, these integrated approaches are reflected in national and wide-ranging planning and implementation programs for Dutch rivers, known as "Room for the River" and the Delta program, a medium and long-term strategy (2050-2100) (Rijke et al., 2012). These programs promote the widening and lowering of floodplains, and the relocation of dikes, in combination with nature restoration and the strengthening of cultural and historical aspects through the discourse of living with water, rather than fighting it. These integrated and collaborative approaches are also implemented elsewhere. For example, in Oregon, the United States, stakeholders integrate flood protection, hydropower and nature restoration (Margerum, 2013). In England, a strategic program "Making Space for Water" was launched in 2005, to integrate flood defense and riparian ecology goals (Potter, 2013).

While Koontz and Newig (2014) have observed a transition from planning to implementation in collaborative watershed management in Germany and the United States, in the Netherlands, a shift from implementation towards maintenance is occurring. The Dutch "Room for the River" program should have reached its final stage at the end of 2015, however it is extended till 2017, when the start of the maintenance phase will be initiated. The planning and implementation phase lead to land-use changes, while the maintenance phase addresses tasks such as monitoring, developing ecological infrastructure and the coordination of maintenance activities (e.g. mowing management, cutting of forested areas, grazing management, etc.). However, this latter phase will occur in the context of declining state budgets and long-term collaborative processes, that often exceed the usual standard government terms of 4 years. Another challenging condition occurs as a result of the fragmented maintenance activities and policies, and actor configuration that is changing towards the local scale

(Fliervoet et al., 2013). Reaching a common maintenance strategy is obstructed by narrow and conflicting policy objectives, especially those relating to flood protection and nature conservation goals (the so called "nature-safety dilemma"; Wiering and Van de Bilt, 2006). These challenges highlight the need for collaborative approaches in the maintenance phase, a requirement which is also acknowledged by stakeholders (Fliervoet et al., 2013).

While collaborative and integrated approaches are incorporated in the planning and implementation phases of Dutch river management, they do not, as yet, form a part of the maintenance phase (Figure 3.1). Sustaining and developing collaborative initiatives are indispensable in this new phase. According to Gray (2004) it is essential to specify clearly agreed objectives to sustain a collaborative process. Moreover, Robinson, Margerum, Koontz, Moseley and Lurie (2011) and Margerum (2011) conclude that more research is needed to understand how agreements between public and private actors, especially for sustaining collaborative initiatives, are enhanced or blocked. We use a case study to analyze discussions about the objectives and membership structures of collaborative initiatives that aim to realize integrated floodplain management. Floodplain management refers to the maintenance of multi-functional floodplains (including tasks such as monitoring and coordination of multiple management activities and functions in the floodplains). In 2011, a Floodplain Management Task Force was established consisting of public and private organizations with the objective of constructing and redefining the objectives of floodplain management, and the then membership structures. The Task Force originated from a planning and implementation program, named "WaalWeelde" (in English; Wealthy Waal). This provincial and multi-actor program, strongly connected to the national "Room for the River" program, aimed to develop a safer, more natural and economically stronger riverine landscape along the River Waal (Smits, 2009). To understand how the stakeholders framed the collaborative initiatives for maintaining floodplains after a shared planning and implementation process, we analyzed both their objectives and the discussed membership structures in an interactive setting. We applied the following research question to guide the analysis: how do diverse stakeholders frame common floodplain management objectives and the associated collaborative membership structures? This research question is explored using a qualitative approach based on an analysis of video and audio recordings, the minutes of meetings, and participant observation of members of the Task Force and "WaalWeelde" program during meetings.

3.2 BACKGROUND

Before analyzing the collaborative objectives and discussed membership structures, we address the context and historical background of the collaborative processes. This highlights the organizational histories of the involved stakeholders that have an important influence on the development and impacts of the collaboration (Watson, 2015a). Moreover, framing theory is used to identify how stakeholders construct meaning, and how the different frames play a role in finding common ground

or not. In this article, the terms collaboration and collaborative refer to any situation in which actors work across organizational boundaries to maintain floodplains (cf. Huxham et al., 2000).

3.2.1 Historical context of "WaalWeelde" program

In the Netherlands the "Room for the River" approach was triggered by two antecedents: (1) the near floods of 1993 and 1995 and (2) the so-called "Plan Stork" (De Bruin et al., 1987) that focused on restoring dynamic natural processes to the floodplains. The near floods had a huge influence on the traditional approach of the water managers; the philosophy of building higher dikes was replaced by one that gave more room for the river. Plan Stork showed how natural processes could be restored while respecting flood protection objectives. The idea of "Room for the River" started as a top-down solution, which initiated conflicts between governmental organizations and society. For example, in the Dutch village of Lent, the state's policy of dike relocation led to many citizens voicing reservations and considerable frustration about what was perceived to be a drastic measure (Cuppen and Winnubst, 2008).

Analysis of such examples led the scientific community to realize that early involvement of diverse stakeholders, especially societal actors, could increase trust in decisions and avoid later frustration (Reed, 2008; Warner, 2006). Therefore, in 2006, the Radboud University established the program of "WaalWeelde" in the Netherlands. The program reconciled the "Room for the River" perspective with bottom-up and multi-stakeholder approaches to realize integrated river management in the planning and implementation phase. The "WaalWeelde" program focused on the floodplain area of the River Waal, which is the main branch of the River Rhine in the Netherlands. The area covers a river stretch of 80 kilometers or 152 km2, which includes the territorial boundaries of one provincial government and fifteen municipalities.

The program identified stakeholders based on their position and role in the decision process (De Groot and Warner, 2011), which resulted in the collaboration between directors of the main authorities (i.e. provincial government, the national water authority and the water board), public officers (including those representing knowledge institutes), businesses and representatives of citizen platforms. Multi-stakeholder processes were organized based on these four stakeholder groups, and supported by tools, such as digital map tables. These public-private collaborations resulted in integrated projects, such as the "Stadswaard" near the city of Nijmegen, where flood protection levels are increased, while riparian nature and recreational and educational activities in the floodplains are enhanced. Finally, the projects and ambitions of the various stakeholders were reconciled in a clear and shared vision called "WaalWeelde" (Willems, 2009). The aim of this vision was to develop a safer, more natural and economically stronger riverine landscape, i.e. multi-functional floodplains along the River Waal (Figure 3.1). In 2008 this vision and program was adopted by the provincial government to support and further develop the participation processes during the planning and implementation phases, but also to ensure that the plans would become reality.

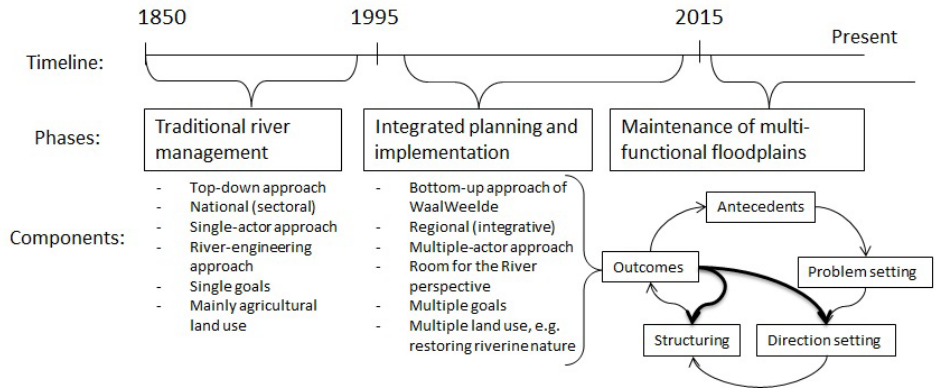

Figure 3.1 | Simplified historical time line of river management in the Netherlands and its related components, such as the five components of a collaborative process, based on Selin and Chavez (1995). Bold arrows represent the return to the direction-setting and structuring phase of the collaborative process.

3.2.2 Components of the collaborative process

The historical context shows the involvement of public, private and societal actors in a highly collaborative process that occurred during the planning and implementation phases. However, maintenance strategies and methods for sustaining membership structures were not discussed in this phase (Fliervoet et al., 2013). Figure 3.1 shows that the collaborative process moved into the phase of monitoring and controlling designed and implemented measures to address declining maintenance budgets, to tune diverse maintenance activities and to reconcile conflicting maintenance policies (flood protection versus nature objectives). In the Netherlands, collaborative maintenance may be seen as a challenging task when it is considered that the land is owned by 15,000 different land owners.

Literature indicates that collaborative processes are often characterized by complex, dynamic and non-linear interactions between diverse components, such as trust-building, shared understanding etc. (Ansell and Gash, 2008). The conceptual process was simplified by Selin and Chavez (1995) and further elaborated on by (Watson, 2015b), leading to the definition of five components that emerged from the examination of collaborative initiatives on natural resource management. Collaborative processes may be characterized by the following components that are encountered sequentially; antecedents (starting conditions), problem setting, direction setting, structuring and outcomes (see also figure 3.1). The integrated planning and implementation approach followed the five phases of the collaborative process which resulted in the implementation of multi-functional floodplains. So, although broadly the same organizations involved in the implementation phase are also involved in the maintenance phase, the direction setting and structuring phase had to be revisited because they did not elaborate on the issues of floodplain maintenance up until this point (bold arrows, figure 3.1). This is not surprising as studies emphasize the importance of feedback loops and the cyclic nature of collaboration (Ansell and Gash, 2008; Selin and Chavez, 1995; Weber, 2003).

3.2.3 Challenges: reconfiguration of actors and variety of membership structures

Understanding stakeholders objectives and roles in collaborative initiatives are important for a common maintenance vision, which is necessary for effective collaboration (C. Hardy et al., 2005). Establishing a formal collaborative structure offers the opportunity to solve problems regarding the maintenance of floodplains that are routed in fragmentation that occurs due to the diverse nature of actors, properties and policies involved. In other words, formal institutional change, such as the introduction of nested enterprise, is needed to overcome fragmentation (Ostrom, 1990). Discussing collaboration raises issues of *who* is engaged and *how* they are involved in a membership structure (Huxham and Vangen, 2000). In this article a membership structure refers to a structure of collaboration between two or more organizations, excluding collaboration within an organization, to maintain floodplains.

The shift towards the maintenance phase adds new geographical interests to the collaborative process as maintenance activities often take place on a local scale and include all floodplain areas, even in areas where no initial management interventions were carried out. The addition of other local nature conservation organizations, land owners and farmers, who combine agricultural activities with nature management on their property, results in the emergence of a new actor configuration.

The second challenge is related to the variety of membership structures and the stakeholder's frames on how they want to collaborate. In 2008, five possible approaches to membership structures for integrated river management in the Netherlands were elaborated on by Vreugdenhil et al. (2008): maintain the existing institutions but adapt the working method; expand the water boards; participate in a project bureau that cooperates with landowners; develop a "Floodplain Stewardship Council"; or create a new regional government (p. 3). Besides these new formal governance approaches, studies show the importance of informal networks or shadow networks to drive innovation, learning and to tackle the maintenance issues (e.g. Olsson et al., 2006). The research of Vreugdenhil et al. (2008) indicates that approaches using a project bureau or a floodplain stewardship council are more promising from a maintenance point of view. In 2011, Fliervoet et al. (2013) interviewed stakeholders regarding their willingness to contribute to the initiation of a floodplain stewardship council, a financially independent floodplain organization that includes public and private stakeholders. The results highlighted resistance in the form of a number of perceived constraints voiced especially by governmental organizations that feared the creation of an additional level of administration. Moreover, governmental organizations argued that too many organizations with conflicting stakes existed, making collaboration within a stewardship council too complex.

3.2.4 Theory of framing

Understanding how stakeholders construct the meaning of collaborative objectives and structures, different perceptions, opinions and stakeholder's frames of reference need to be analyzed (Emerson et al., 2012; Gray, 2004; Selin et al., 2000; Termeer, 2009). The research presented here uses the theory of framing developed in the domain of multi-actor collaboration (Dewulf et al., 2011; Gray, 1989; C. Hardy et al., 2005). Framing theories are "generally focused on studying the various ways

in which people strategically make sense of reality and how they add meaning to ambiguous and complex situations" (Van den Brink, 2009, p. 35). Different underlying visions and identities in collaborative processes often prevent stakeholders from finding common ground (Gray, 2004) and can form an obstacle for shared understanding. Fragmented frames can also evolve into a prolonged conflict regarding what the problem or issue is really about (Schön and Rein, 1994) with the risk of delaying effective decision-making. It is rarely the case that consensus on collective action is achieved through a process of divergent reframing, however Emery et al. (2013) did show that it is possible if participants reframed the problem according to their own prior values in an environmental case.

3.3 METHODS

The fragmentation of floodplain management in the Netherlands is reflected in our case study, the floodplains of the River Waal. The study area – program of "WaalWeelde" – includes a diverse group of governmental and non-governmental actors, when focusing on the maintenance of floodplains (Table 3.1). The Directorate for Public Works and Water Management (Rijkswaterstaat) and the water boards are the authorities responsible for flood protection. Rijkswaterstaat is responsible for the river, and is allowed to regulate all activities in the floodplains that influence water quality and quantity. The water boards are mandated to maintain the levees and dikes. In 2014, the Dutch Ministry of Economic Affairs devolved responsibilities for the development and maintenance of nature areas to the provincial governments. The provincial governments plan was to implement and protect European Natura2000 objectives, such as hard and softwood forest in the floodplains, based on relevant European legislation and allocate subsidies to third parties for nature conservation. The municipalities maintain the recreational infrastructure in floodplains, such as the roads, hiking trails and benches.

The group of non-governmental organizations with an interest in maintenance activities in the floodplains include nature conservation organizations, farmers, land owners, citizen platforms, and sand, gravel and clay mining industries (Table 3.1). Farmers are interested in nature conservation, as management practices (e.g. habitat provision for wetland birds), qualifies them for nature subsidies. This interest has led to the establishment of farmer's associations with the goal of combining nature conservation and agricultural activities.

Table 3.1 | Characteristics of the actors involved in the maintenance of floodplains.

Actor	Organizational aim or responsibility	Governmental or non-governmental organization	Landowner
Rijkswaterstaat (Directorate for Public Works and Water Management)	Manage all activities in the floodplains that influence water quality and quantity (flood protection) on a national scale.	Governmental	YES
Ministry of Economic Affairs	Responsible Ministry for national agriculture and nature policies	Governmental	YES (In Dutch: *de NURG-gronden*)
Provincial government	Responsible authority for nature conservation goals, including the implementation of the European Natura2000 objectives on the provincial scale	Governmental	NO
Water Board	Responsible for dikes and levees (flood protection)	Governmental	Owner of dikes and levees
Delta Program	A medium and long term strategy (2050-2100) to keep the Netherlands flood and drought free in the face of extreme climate change scenarios	Governmental	NO
Municipality	Responsible for local spatial planning: regional development through balancing economy, nature, recreation and flood protection.	Governmental	Owner of floodplain infrastructure, e.g. cycling and hiking trails
State Forestry Service	National nature conservation	Governmental	YES
Nature conservation organizations	Nature conservation, sometimes in combination with the conservation of cultural heritage	Non-governmental	Some do, others do not own land
Agricultural Nature Association	Combining agricultural activities with nature conservation	Non-governmental	NO
Sand, gravel, and clay mining industries	Making profit and generating a long-term perspective for the extraction of sand, gravel and clay from floodplains	Non-governmental	YES
Farmers and other land owners (e.g. camping site owner)	Farming or other local business	Non-governmental	YES, but farmers often rent areas on floodplains for cattle or crop farming
Citizen platforms	Provision of attractive and accessible riverine landscape for recreation (e.g. bike and hiking trails)	Non-governmental	NO

3.3.1 Data sources and data gathering

Data collection involved participant observation and the analysis of video and audio recordings, meeting minutes, and documents over the period of June 2011 until January 2014 (Table 3.2). To understand how stakeholders construct meaning of collaborative objectives and structures in an interactive setting, we used two events for the collection of primary data: (1) an exploratory workshop in June 2011 and (2) the Task Force writing session "Stewardship Floodplain Management" in June 2013. Additionally, both workshops were key events for the development of the final report of the Task Force. During the study period, all workshops and meetings were organized by the Radboud University and an independent mediator who chaired all events and discussions.

The first recording was made during an exploratory workshop, where 29 participants discussed questions such as "what is integrated floodplain management?" and "how can we collaborate to realize integrated floodplain management?" The workshop was used to ultimately identify problems concerning maintenance objectives, organizational structures and financial resources. This workshop initiated the establishment, in 2011, of the Floodplain Management Task Force whose function was to explore possibilities for collaboration. The Task Force was composed of members of the Provincial government of Gelderland, Rijkswaterstaat, the Government Service for Land and Water Management (which was disbanded due to state budget cuts at the beginning of 2015), the Dutch State Forestry Service, the Ministry of Economic Affairs, a water board, a representative of the agricultural sector and Radboud University. The second event includes the recording of a writing session in which eight participants (members of the Task Force) elaborated on possibilities for collaborative floodplain management in a pilot project. The workshop consisted of presentations and a round table discussion on possible membership structures. The workshop led to the organization of fourteen meetings and three workshops with the stakeholders (Table 3.2). The Task Force finished its report with recommendations for integrated floodplain management in January 2014.

The secondary data consisted of the minutes of other meetings, participant observations, and documents that supported and provided context for our interpretations. The first author of this article participated in all events and was the assistant process organizer. The atmosphere of the meetings and workshops can be described as open, constructive, and friendly. The meetings were captured in written minutes, and the workshops in video or audio recordings, which were literally transcribed (Silverman, 2006) using the software program F4.

Table 3.2 | Chronological overview of events.

Date	Events	Dates and themes
June 2011	Explorative workshop integrated floodplain management†	Video recording of the discussion (29 participants) on the 24th, minutes
October 2011	Task Force meeting (1)	Minutes, formulating objectives of Task Force
December 2011	Task Force meeting (2)	Minutes, serious gaming
March 2012	Task Force meeting (3)	Minutes, formulation of pilots
April 2012	Task Force meeting (4)	Minutes, proposal dashboard floodplain management
May 2012	Task Force meeting (5)	Minutes, progress of objectives Task Force
June 2012	Task Force meeting (6)	Minutes, proposal pilot *Rijnwaarden*
September 2012	Task Force meeting (7)	Minutes, table of content for report integrated floodplain management
October 2012	Task Force meeting (8)	Minutes, floodplains and biomass
December 2012	Task Force meeting (9)	Minutes, financial flows in floodplains
March 2013	Task Force meeting (10)	Minutes, progress dashboard and proposal for a second pilot ARK-A50
April 2013	Task Force meeting (11)	Minutes, presentation stewardship council
June 2013	Task Force writing workshop "Stewardship floodplain management" (12)†	Audio recording of the discussion (8 participants) on the 27th, minutes
October 2013	Task Force meeting (13)	Minutes, discussion on report "Governance structure floodplain management"
November 2013	Task Force workshop "Recommendations" (14)	Audio recording of the discussion (8 participants), minutes
December 2013	Task Force meeting (15)	Minutes, discussion on final report and recommendations
January 2014	Task Force meeting (16)	Minutes, discussion on final report and recommendations

† Selected as primary data

3.3.2 Transcription analysis

The qualitative analysis started by identifying and labelling issues relating to collaboration objectives and membership structures in the transcripts. Later, these quotes were grouped into categories such as efficiency, co-ordination, or flood protection objectives. The transcripts were repeatedly read and compared to get a full understanding of the interactions that occurred in the different workshops. The transcripts were analyzed by coding and memoing in the software program Altas-ti. The codes referring to the collaboration objectives were related to the question: What are we aiming for in collaborative floodplain management? Membership structure codes dealt with the questions: how do participants construct collaborative arrangements? And who is regarded as a member of the collaboration? Table 3.3 illustrates the variety of discussed membership structures.

Additionally, conversations concerning the interaction of collaboration objectives and membership structures were identified in order to illustrate how collaborative floodplain management was shaped. Again, by thoroughly reading and interpreting these selected sequences, we analyzed how objectives and structures evolved over the course of the interactive process. In this way, fragmentation or agreement on the objectives or structures could be identified. A limitation of our approach is that we did not have insight into other collaborative and informal relationships between the participants outside of the workshops.

3.4 RESULTS

The results of the analysis show how participants shaped collaborative floodplain management. Firstly, we present the range of collaboration objectives and membership structures expressed by the participants. Secondly, a conversation between participants in the writing workshop was analyzed to illustrate the influence of different public servant's frames on the envisioned governance structure.

3.4.1 The collaboration objectives

In both workshops a wide range of collaboration objectives were discussed and participants tried to find synergy between the different objectives. A nature conservationist stated that collaboration should integrate floodplain maintenance into floodplain planning, because "maintenance is not included in the planning phase; it's just afterwards; now they [water managers] have a gigantic problem [the rapid softwood growth]." A representative of an NGO framed the aim of the collaboration as "the challenge to just simplify the fragmented picture". These objectives relate to the need for coordination of the fragmented decisions and maintenance activities in the floodplains and were repeated by many participants. Especially by private participants highlighted these objectives by stating that coordination of public decisions should create more flexibility for entrepreneurship in the floodplains. A representative of the sand and clay mining companies articulated a need for clearly formulated objectives that allow public organizations to take a facilitator's role in the collaborative process.

A consultant framed that the collaboration should "activate private organizations to realize the public objectives." This reflected the idea that public organizations should coordinate their floodplain maintenance objectives, and create win-win situations by combining them with activities of farmers or recreational organizations. A consultant added, "As I see it, the gains can be made in efficiency, in collaboration. Today, the slope of the dike is mowed twice by the water board and each time the cows have to be moved; and then Rijkswaterstaat comes along to remove the trees on the groins. I mean there is a lot of inefficiency." The consultant is suggesting that the mowing and tree removal should be carried out at the same time by one organization. This argument is related to efficiency as an aim of collaboration; it also refers to the notion that private organizations are more efficient at providing public services, and therefore emphasizes for more collaboration with public organizations.

Participants emphasized the added value of private organizations investing in public objectives. An NGO representative said, "more value can be achieved, such as private and public benefit, for the same amount of government investment." Additionally, the efficiency aim is possible achieved through the advantage of economies of scale through collaboration. As expressed by a public servant, "If it is part of your pilot project, part of your aim to show that it is more efficient to make a choice left or right [of the river], where you intervene periodically [for removing vegetation], then a single floodplain section [of approximately 500 hectares located on one side of the river] is not enough [as scale for the collaborative pilot]." This suggests that the collaboration objective is linked to the scale of the working area. The above quotes reveal that efficiency objectives refer to different activities, both on the decision level (scale of pilot) as on an operational level (removing of forest vegetation).

Participants also discussed access to financial or knowledge resources as an objective for collaborative initiatives. A public servant stated: "What we see is that Rijkswaterstaat has a number of financial flows, the provincial government has a financial flow, the water board has some financial flows [...] You need to be able to reshuffle these financial budgets." Moreover, "You want to get the knowledge from the parties who are in [the collaboration]." Additional objectives for collaboration are; easing the government's burden; working together with farmers; and promoting a moral imperative that "there is no other way than collaboration", based on the idea that integrated floodplain management cannot be tackled by organizations that act alone.

All these objectives of coordination, efficiency, and access to resources, showed how participants sought different benefits from the collaboration. Interestingly, the discussion did not touch upon the underlying issue of reconciliation of nature and flood protection goals, or the common vision of "WaalWeelde" adopted in the planning and implementation phases.

3.4.2 The discussed membership structures

During both workshops, the proposed membership structure was required to adhere to the shared baseline requirement that the structure should not lead to a new administrative level. This boundary condition was set by the governmental organizations, who argued that a new administrative level did not fit in with the spirit of decentralization. The results highlight a difference between the membership structures envisioned in the exploratory workshop (2011) and the writing workshop (2013) (Table 3.3). In the exploratory workshop, the majority of participants suggested structures that resulted in collaboration between public and private organizations. For example, the representative of the sand and clay mining industry stated that "We do not need a new level of administration, but a structure that links private and governmental organizations". Some participants argued that the existing water board should function as an umbrella organization for floodplain management. Furthermore, some specific structures such as a land owner's association, a collaboration between the largest nature conservation organizations, or a collaboration of four stakeholder groups: directors, public officers, businesses and citizen platforms (WaalWeelde approach), were mentioned in the exploratory workshop.

In the writing workshop, the emphasis focused more on collaborations between governmental organizations (public-public collaboration) than on a public-private structure. Some participants also proposed membership structures between land owners and nature conservation organizations (private-private structure). "If you really want to unburden the government, then I do not want to be a member [of the collaboration]. The Province of Gelderland wants an external organization that does it all" (Public servant). An external organization refers to a separate organization to the Province of Gelderland that would take responsibility for maintaining floodplains. Only two participants expressed the need for a governance structure that included collaborative initiatives on a public and private basis.

Discussions about membership structures were framed in relation to the scale of the geographical area, such as all floodplains near the River Waal or a specific floodplain area (see above reference that refers to the efficiency objective). Scale frames were also applied from a more administrative point of view. For example, a public servant argued that a decision should be made on "who decides and who performs, based on the two levels in the national coalition agreement". Additionally, it was suggested that time scale, such as long-term versus short-term objectives, influence the size of a membership structure and who should be involved. According to a public servant, "the size of the area [to be managed by the membership structure] is determined by the willingness and interaction of both sides; the top layer including the governments and the bottom layer which consists of nature managers and land owners".

In the exploratory workshop (2011), the participants envisioned a public-private membership structure, however during the writing workshop (2013) the emphasis shifted towards public-public collaboration. Additionally, participants often used arguments relating to scale or efficiency objectives to support or reject the proposed membership structure.

Table 3.3 | Possible membership structures envisioned by the participants in both workshops. Number indicates participants arguing in favor of corresponding collaboration.

Discussed membership structures	Exploratory workshop (N=29)	Writing workshop (N=8)
Collaboration between directors, public officers, businesses and citizens (*WaalWeelde* approach).	1	
Water board as umbrella organization	3	
Public-private structure (PPS)	6	2
Collaboration between land owners and nature conservation organizations	1	2
Collaboration between the largest nature conservation organizations	1	
Collaboration between the public organizations (Provincial government, *Rijkswaterstaat*, Water Board, and municipalities)		5
Governance structure including two levels of collaboration: (1) who decides and (2) who implements	1	1

3.4.3 Framing floodplain management in interaction: mapping a governance structure

The results reveal a broad range of proposed collaboration objectives and discussions on who should be engaged and how they should be involved in a membership structure. The following exchange between participants illustrates how a shared governance structure was shaped in an interactive setting. The reader should be aware that the underlying collaborative objective of reconciliation of nature and flood protection goals was not discussed during this exchange. The example was selected from the writing workshop, where participants discussed how collaborative floodplain management could be shaped in a pilot project. The contributors consisted of members of Rijkswaterstaat (R), the Provincial Government (P), and a scientist (S). Public servants (P and R) discussed which organizations should be part of a new collaborative structure for floodplain management. Participant P preferred private-private collaboration (called Stewardship), while public servant R was in favor of a public-public partnership. A public-private structure was considered unrealistic and ineffective due to the many stakeholders involved. The exchange also illustrates the role the public organizations wish to play in floodplain management:

1. P: If you really want to unburden the government, then I do not want to be a member [of the collaboration]. The Province of Gelderland wants an external organization [i.e. non-public] that does it all. […]
2. R: I would find it insufficient [with regard to the issue of trust] if a Stewardship would consist of all those [private] representatives who cooperate and decide together on the right management proposal. Would that lead to a positive response from the government? For example a permit from Rijkswaterstaat?

3. S: What I find important to note here ...
4. R: And if you want to [...] add those private organizations [...] I think they will have a long way to go before they are trusted [by Rijkswaterstaat]
5. P: Well to be honest, that is a reason or would be a reason for the provincial government to do it, because you want to be carefree; you want to place floodplain management outside your doors. You do not want to be a member yourself [of a collaboration structure]. […]
6. R: If you choose for a private organization. Actually, my vision would be to build on existing structures, to make a membership structure consisting of public servants who are already involved in floodplain management. In the end, the collaboration will literally deliver more ...
7. S: Such as the Delta Program [a public collaboration, wherein representatives of public organizations are seconded to a new organization]
8. R: That it is able to work faster, that it's more accepted [.. uh ..] and cheaper too.

The proposal by public servant P is to create a private-private collaboration, which coordinates decisions on maintenance activities and management proposals to unburden the government (1). In (2), participant R explains that co-ordination of activities without involving Rijkswaterstaat will obstruct permits for maintenance activities, because of the issue of trust. Additionally, in (4), R argues that if the decisions are shifted to a more private structure, it would be difficult to get the trust of the water managers. In conclusion, participant R advocates a public-public collaboration including Rijkswaterstaat as a member. Public servant P still argues, in line (5), that the Province does not want to participate in such a public-public collaboration because it neglects the aim of unburdening the government. In (6), participant R tries to set up a new objective in favor of a public-public partnership by arguing that a structure should connect the (public) persons currently operating in the floodplain management field. In response, participant R rephrases the collaboration objective to one of efficiency: "faster, accepted, and cheaper" (8). The scientist then comes up with an example of a possible public-public structure, such as the Delta program (7).

This exchange illustrates that public servants (P and R) want to play different roles in floodplain management. Participant P is happy to leave the responsibility to private organizations and implicitly suggests that enhancements, especially increased coordination, have to be made on a private level. Public servant R prefers a high degree of influence on floodplain management activities and speaks about trust and efficiency gains on the level of public-public collaboration. The representative of Rijkswaterstaat wants to be part of a new membership structure instead of devolving power to private organizations.

The combination of the two dominating membership structure frames described formed the basis for designing a governance structure for floodplain management, which includes a public-public collaboration (Waal Board) and private-private collaborations (Stewardships). Further elaboration by the participants on the membership structures revealed that the Waal Board is composed of representatives of four public organizations and is framed as a project bureau rather than a new administrative level. The stewardships consist of structures existing between land owners and nature

conservation organizations who collaborate on a local scale (Figure 3.2). The envisioned governance structure makes a clear distinction between the decision and operational levels by dividing public and private stakeholders.

In summary, one public servant pursued collaboration without private organizations in order to be fully in control of floodplain maintenance decisions, the second public servant expressed a wish to shift maintenance responsibilities to the private level. The predominance of these two membership structure frames resulted in an avoidance of discussions concerning the construction of a public-private collaboration, but instead shaped a vision of a shared governance structure.

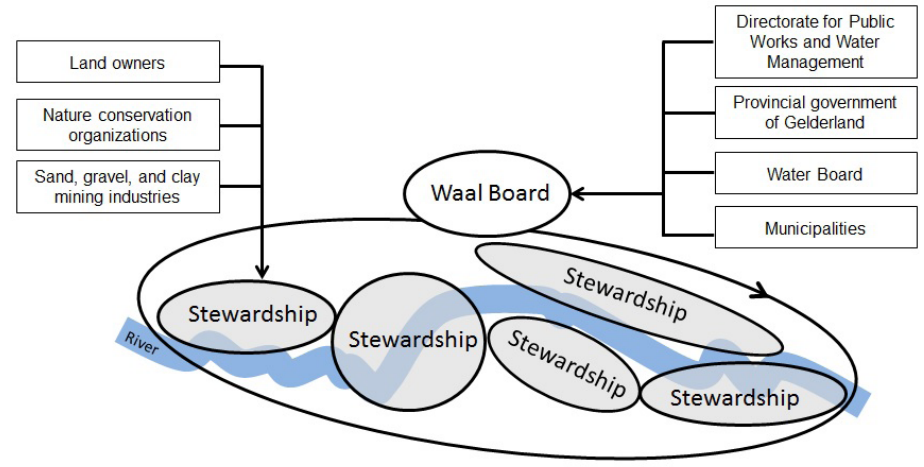

Figure 3.2 | Overview of the governance structure as described by the task force; it includes a Waal Board (public-public collaboration) and stewardships (private-private collaboration). The thick line symbolizes the river.

3.5 DISCUSSION

In this section we discuss the collaboration objectives and membership structures favored by the stakeholders in floodplain management. We discuss how the participants shaped a vision of a shared governance structure for floodplain management (Figure 3.2) without discussing the underlying collaborative objective of integrating flood protection and nature goals. Before drawing some conclusions, we reflect on the opportunities and challenges of this newly envisioned governance structure.

3.5.1 Fragmented issue framing

As stated in the introduction, while the collaborative and integrated approaches are incorporated in the Dutch planning and implementation phases, they have not yet been introduced in the

maintenance phase. The analysis of the collaborative objectives and membership structures showed that collaboration in floodplain management is a dynamic and complex issue, which is framed by participants in many divergent ways.

Participants framed collaboration objectives in terms of efficiency (e.g. economies of scale), coordination, sharing knowledge and financial resources, easing the government's burden, working together with farmers and "there is no other way", instead of addressing the conflicting issue of integrating flood protection and nature rehabilitation objectives. Of course, no one would be against more efficiency in floodplain management, but discussions on efficiency objectives only may be described as shallow, superficial, and not substantive. Discussions between participants never touched upon the substantive or underlying objectives. Similarly, the study on collaborative efforts by Layzer (2012, p.198) concluded that "stakeholder groups tended to avoid the most difficult issues or to mask differences by using vague language—decisions that ultimately haunted implementation." According to Agranoff (2003), not including issues on the agenda that are threatening or contrary to consensus building is required to sustain collaborative initiatives. To conclude, the diverse and vague collaborative objectives show that the participants did not find a common collaborative objective aimed at maintaining the multi-functional floodplains. Moreover, the expectation is that a discussion on more fundamental objectives will return when collaborative initiatives are implemented (Gray, 2004; Margerum, 2007).

Secondly, in an interactional setting, we analyzed how participants framed diverse membership structures. The majority of the participants initially envisioned a public-private structure. Later in the process, public-private collaboration was no longer an option because it was considered to be unrealistic and ineffective due to the diversity and high number of stakeholders that would be working together. The issue of diversity prevented public-private collaboration, which is quite common in managing complex issues (Huxham et al., 2000; Scarlett, 2013). However, analyzing the discussions revealed two predominant frames that defined possible membership structures. The representative of Rijkswaterstaat wanted to be involved and in control of a new collaborative initiative and proposed a public-public collaboration structure. Rijkswaterstaat still maintains a powerful position and is strongly driven to control the maintenance of floodplains instead of sharing decisions with civil society actors or private organizations (Van den Brink, 2009). The representative of the Province, on the other hand, preferred a private-private structure to unburden the government.

However, the participants solved the differences in issue framing by adopting a governance structure, which included elements of both membership structures, instead of deciding on one of the initially proposed membership structures. This strategy is similar to the interaction strategy of frame reconnection proposed by Dewulf and Bouwen (2012). Frames were connected by taking both membership structures seriously and by neglecting the incompatibility between them (Dewulf and Bouwen, 2012), to achieve consensus among the participants of the Task Force. This consolidation of different issue frames into one that is jointly meaningful can provide motivation

and commitment for collective action (Dewulf et al., 2011), which is reflected in the collaborative agreement of governmental directors. In March 2014 during a provincial conference, the agreement was pronounced by the provincial government and Rijkswaterstaat to cooperate on the maintenance of flood protection and nature rehabilitation goals.

Throughout the analysis, the participants use collaboration objectives and scale frames to support or reject the discussed membership structures. The use of collaboration objectives reflects the idea that structures of collaboration are continually changing, partly because unavoidable changes to the collaborative objectives simply meet different membership needs (Huxham and Vangen, 2000). Participants used diverse scale frames such as geographical, administrative and time frames, to include or exclude stakeholders from the membership structure. Research illustrates that the diversity of scale frames or even mismatches of scale frames hinder the decision making process (Van Lieshout et al., 2011).

3.5.2 Increased separation, despite shared governance structure

The analysis of discussions between participants surrounding who should be engaged and how they should be involved in a membership structure indicated that participants recognized the importance of collaboration for maintaining multi-functional floodplains. This recognition is reflected in the vision of integrating private, locally based organizations into a Stewardship, the public organizations into a Waal Board, and the intention of the governmental directors to cooperate. This horizontal integration is understandable when issues, such as organizational arrangements, implementation strategies and trust are taken into account (Robinson et al., 2011; Termeer, 2009).

However, what we observed over the course of the study period was a separation instead of integration due to abandonment of the vision of a public-private collaboration, which was envisioned in the exploratory workshop and applied in the planning phase of the "WaalWeelde" program. Despite the provision of a platform for all stakeholders through the creation of a Waal Board and Stewardships, a clear distinction of responsibilities between public and private organizations is made, in contrast to the joint planning approach of the "WaalWeelde" program in which a range of actors were involved in the redesign of floodplains based on a bottom-up approach, in public-private collaboration.

Reasons for this separation of responsibilities could be the vague collaborative objectives proposed, and a lack of shared understanding that occurred due to the initial focus of the members of the Task Force on the direction setting and structuring components of the collaborative process. Layzer (2012) showed that collaborative and adaptive approaches often lead to a lowest common denominator approach, because participants cannot achieve consensus on the most challenging issues or, as in this case, are unwilling to address issues relating to core value differences (flood protection versus nature goals).

An additional potential reason for the separation of responsibilities is that participants reverted to traditional approaches by using traditional instruments, such as permits and single maintenance

activities (Klijn and Teisman, 2003). Since the maintenance of Dutch floodplains comes from a long tradition of organizations acting alone, it seems to be difficult to abandon sectoral and unilateral traditions, which is inter alia expressed by the following sentences; "[...] to build on existing structures, so making a membership structure of public servants who are already involved in floodplain management" or "you will not get a permit." These perspectives based on the past and the reliance on existing governmental actors does not enhance innovative inter-organizational arrangements (Hibbert and Huxham, 2010). Therefore, we argue that the traditional approach in combination with framing the public-private structure as complex, unrealistic and ineffective due to the variety and number of stakeholders that would need to work together, contributed to the avoidance of discussions on the opportunities for a public-private collaboration. To avoid this reversion to a traditional approach, it is necessary for public servants and practitioners to begin to understand the potential outcomes that could be realized by these new collaborations in order to maximize the benefits (Keast et al., 2004).

3.5.3 Implications and future challenges

Translating the governance structure into practice will result in opportunities as well as new challenges. An opportunity is that the envisioned governance structure (Figure 3.2) creates flexibility by enabling a response to any problem and any objective concerning the maintenance of floodplains. This is because collaboration objectives or boundary conditions that could limit creativity are lacking. Potentially, the proposed structure can be seen as a way of enhancing adaptive management, in that it can adapt rapidly to meet diverse challenges (Scarlett, 2013). The governance structure allows policy fragmentation to be addressed, a factor that often obstructs the formulation of joint objectives (De Boer and Krantzberg, 2013). This opportunity occurs because the governance structure allows public servants to integrate policies and share responsibilities as part of one governmental entity (e.g. Waal Board). In this way the floodplains may be maintained holistically as one social-ecological system. Robinson et al. (2011) also emphasizes the need for more collaboration on a policy level to address the diffuse and complex nature of integrated water resources management. Enhanced institutional change may be facilitated by creating private – private collaborations (Stewardships) to overcome land fragmentation, which obstructs the operationalization of integrated floodplain management. In this study, the provincial government made a strong case for supporting collaboration between private actors, which was followed by a local pilot. However, time will tell whether this will lead to the described benefits being achieved.

Although, the proposed governance structure will likely support more collaboration within floodplain management, challenges and limitations will remain. Firstly, the case study illustrated how fragile a collaborative process is and showed the difficulties faced when attempting to sustain public-private collaboration in integrated water resource management, in particular in integrated floodplain management. According to Biswas (2008) the definition of integrated water resource management remains highly amorphous, which prevents full integration and reduces the feasibility of operationalizing the concept in practice. Moreover, Rijke et al. (2012) emphasized the challenge of continuing the newly introduced governance approach of "Room for the River" in the middle- and long-run strategy (2050-2100) of the Netherlands, i.e. the Delta program.

Secondly, collaborative initiatives are hard to sustain over a long period of time, especially when collaboration is based on voluntary actions (Margerum, 2011). The role of trust, relationships and understanding each other are key issues in collaborative processes (Ansell and Gash, 2008). The challenge is to enhance collaborative capacity by finding key persons or facilitators for both collaborations (Waal Board and Stewardship) within the governance structure, "because they can provide leadership, trust, and meaning, and they can help the transformation of organizations toward a learning environment" (Folke et al., 2005, p. 441).

Thirdly, the challenge for the managers of public organizations is to adapt to a more facilitating or collaborative role in the context of collaborative governance, because public organizations still continue to be powerful and influential stakeholders (Fliervoet et al., 2016). For example, state water agencies in England strengthened their command and control in the water sector, going against the spirit of collaboration, despite using words such as partnerships and collaborative governance (Watson et al., 2009). Benson et al. (2013) described increased collaboration compared to previous approaches in catchment management in Europe, the United States and Australia. However, the authors also stated that "a shift towards collaborative governance has been marginal; because power is still largely concentrated by the government, the style remains essentially centralized" (p. 1708).

Nationally and internationally, questions have been raised asking if the envisioned governance structure will move river management towards a more collaborative and integrated floodplain management process in the future. We argue, based on the observed separation due to abandonment of the vision of a public-private collaboration, and the described challenges, that the envisioned governance structure will not result in a major transformation of the collaborative process to maintain multi-functional floodplains. This will threaten the win-win solutions developed by stakeholders during the planning and implementation phases. However, the need for collaboration, recognized by participants, may form a first step towards a change in floodplain management if key leaders and informal networks (shadow networks) are included in the formal governance structures (Olsson et al., 2006). Shadow networks are characterized by political independence from the formal rules and regulations and are motivated by a willingness to experiment and generate alternative solutions to emerging problems (Olsson et al., 2006). In Hungary, Sendzimir et al. (2007) described the failure of the formal river management regime that led to informal learning. In this case, a dialogue was set up between international scientists and an informal shadow network composed of Hungarian stakeholders with the aim of exploring new ideas to facilitate the transformation of the failed river management regime.

In other words, further institutional developments (including the emergence of shadow networks) and the avoidance of traditional approaches are required to ensure that integrated and collaborative floodplain management will occur and be effective. Therefore, more research is required to describe collaborative processes and how they may be sustained in the face of changing actors and during a shift towards the maintenance phase.

3.6 CONCLUSION

Our case study describes the framing of collaboration objectives and membership structures by participants of two workshops on the collaborative management of floodplains. The results illustrate how the Netherlands has struggled with the adoption and continuation of integrated and collaborative approaches in the maintenance phase of river management. Issues of fragmentation and complexity of current maintenance activities were highlighted. Collaboration objectives were discussed, but remained superficial, framed only in terms of efficiency and co-ordination and did not address the need for reconciliation between flood protection and nature objectives. While no consensus was found on substantive collaboration objectives, participants jointly mapped a governance structure for new collaborative initiatives by reconnecting the two dominant membership structure frames. Participants envisioned a public-public collaboration (Waal Board) and multiple private-private collaborations (Stewardships).

This governance structure divides responsibilities between public and private organizations, in contrast to the vision of public-private collaboration adopted during the planning and implementation phases. This division could have stemmed from the vagueness of the proposed collaborative objectives, conflict between membership structure frames, a lack of shared understanding of the problems faced, or a reversion to traditional approaches by participants. Based on our observations, we suggest that it is difficult to sustain integrative and collaborative arrangements when a shift from the planning and implementation phases towards a more locally based maintenance phase occurs, i.e. a shift to floodplain management. These difficulties will increase complexity when adopting a collaborative governance approach in river management because newly constructed collaborative approaches need to take into account all the different phases of river management. Finally, analysis of other case studies relating to the maintenance phase are needed to increase understanding of how institutional settings develop over a long period and what kind of institutional settings are required to maintain the floodplains in an integrated way. Moreover, these case studies should include descriptions of the stakeholder's frames of the collaborative processes in floodplain management in order to gain further understanding of their dynamics.

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CHAPTER 4

Analyzing collaborative governance through social network analysis: a case study of river basin management along the Waal River in The Netherlands

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ABSTRACT

Until recently, governmental organizations played a dominant and decisive role in natural resource management. However, an increasing number of studies indicate that this dominant role is developing towards a more facilitating role as equal partner to improve efficiency and create a leaner state. This approach is characterized by complex collaborative relationships between various actors and sectors on multiple levels. To understand this complexity in the field of environmental management, we conducted a social network analysis of floodplain management in the Dutch Rhine delta. We charted the current interorganizational relationships between 43 organizations involved in flood protection (blue network) and nature management (green network) and explored the consequences of abolishing the central actor in these networks. The discontinuation of this actor will decrease the connectedness of actors within the blue and green network and may therefore have a large impact on the exchange of ideas and decision-making processes. Furthermore, our research shows the dependence of non-governmental actors on the main governmental organizations. It seems that the Dutch governmental organizations still have a dominant and controlling role in floodplain management. This challenges the alleged shift from a dominant government towards collaborative governance and calls for detailed analysis of actual governance.

4.1 INTRODUCTION

A key challenge for environmental management is the number and diversity of the actors and sectors involved, each with their own perceptions, interests and resources (Robinson et al., 2011). To address this challenge, multiple collaborative approaches have been developed, such as adaptive management (Folke et al., 2005; Pahl-Wostl et al., 2008; Stringer et al., 2006); multi-level governance (Blomquist, 2009; Gruby and Basurto, 2014; Lienert et al., 2013); community-based natural resource management (Kellert et al., 2000); network governance (Klijn et al., 1995; Rhodes, 2007) and collaborative governance (Emerson et al., 2012). Despite their different foci, they share a number of characteristics:

1. They all address collaborations across organizational boundaries between diverse stakeholders, such as governmental actors, non-governmental actors and/or citizens.
2. They all promise or expect better coordination between authorities and more integrated management (Emerson and Gerlak, 2014).
3. They all assume a shift from state-centered, hierarchical top-down government towards less formalized governance by networks of interdependent stakeholders that extend beyond the government sector ("from government to governance"; Huitema and Meijerink, 2014; Mostert, 2015; Rhodes, 1997; Termeer, 2009).

Reasons given to collaborate include the limited resources of government: government simply does not have all the information, power and finances necessary for environmental management, which makes it dependent on other stakeholders (Gray, 1989; Huxham and Vangen, 2005). Budget cuts over the past years have only increased this dependence. Moreover, involving diverse stakeholders can increase public support, reduce opposition and improve implementation of government policy. And finally, there is the moral argument that involving stakeholders makes environmental management more democratic (Mostert et al., 2007; Stringer et al., 2006).

Empirical studies on the alleged shift from government to governance are scarce (e.g. Bodin and Crona, 2009). In England, Watson et al. (2009) described how recent institutional reform in the water sector has actually strengthened control by state water agencies, despite the use of language emphasizing partnerships and collaborative governance. Non-state actors and local authorities have been given substantial roles in the implementation of management measures, but the measures are still decided upon by national government and national government agencies, who also control implementation. Rather than increasing democracy and responsiveness, this has reduced public accountability because central government is able to deflect the blame when things go wrong (Watson et al., 2009).

The account given by Watson et al. (2009) raises a number of questions concerning the alleged shift from government to governance. The aim of the present article is to shed some more light on this issue and describe the complexity of the current collaborative and cross-boundary interactions

between governmental and non-governmental actors concerning environmental management, using a case study approach. The method used is social network analysis (SNA: Borgatti et al., 2009). SNA analyzes social networks in terms of a set of nodes (e.g. individuals or organizations) and a set of ties between these nodes. It can provide insight in the position and role of individual actors in the network and help to identify central, coordinating and bridging organizations whose activities connect actors that otherwise would not have been connected (Berkes, 2009; Rathwell and Peterson, 2012). The structure of ties between these actors gives insight in intra and inter-group collaboration (e.g. within government and between government and non-governmental actors) (Lienert et al., 2013). Finally, overall network properties, such as the number of ties compared to the number of possible ties, give insight in the potential for collaborative action and structural cohesion in the network (Olsson et al., 2004).

The case that will be analyzed is the maintenance of floodplains in the Dutch Rhine delta. The multi-functionality of these floodplains leads to interdependence of stakeholders with respect to the different functions, especially concerning flood protection and nature restoration (Fliervoet et al., 2013; Schindler et al., 2013). Both the "blue network" concerning flood protection and the "green network" concerning nature will be analyzed. The following questions will be addressed:

(i) Which actors are involved and what are their collaborative relationships to ensure flood protection (blue network) and/or reach nature objectives (green network)?
(ii) Which actors play a coordinating or bridging role?
(iii) What is the role of governmental versus non-governmental organizations in both networks?

The next section presents the case study and the methodology used. Subsequently, the results are presented. The article concludes with a discussion and conclusions on the main research questions.

4.2 METHOD

4.2.1 Case study: floodplain management

The case study that is central in this article is the maintenance of the floodplains of the River Waal, the main branch of the River Rhine in the Netherlands. The case study area includes one province and 15 municipalities and covers a river stretch of 80 kilometers or 152 km^2 (Figure 4.1). The responsible authorities regarding flood protection are the State Water Agency (Directorate for Public Works and Water Management), which is responsible for the river itself and can regulate all activities in the floodplains that influence the water quality and quantity; and the Water Boards, which are responsible for the dikes and levees. Responsibility for maintaining and developing nature in the floodplains was decentralized in 2014 from the Ministry of Economic Affairs, which is also responsible for agriculture and nature policy, to the provincial governments. The provincial governments plan and implement EU Natura2000 objectives based on the European legislation and

allocate subsides for nature conservation. This may require changes in land use, which is regulated by the municipalities.

Alongside the authorities, a variety of private individuals, groups and organizations have an interest in the maintenance activities in floodplains. These include nature conservation organizations; farmers; research institutes; and sand, gravel and clay mining industries. The nature conservation organizations often deal with cultural heritage as well. Many farmers are also interested in maintaining biodiversity to be eligible for nature conservation subsidies. They are organized in farmers' associations which combine agricultural activities with nature conservation.

In the 1990s, public and private stakeholders developed and implemented integrated plans to improve flood protection while restoring dynamic natural processes and safeguarding agriculture and recreational interests. These plans involved for instance the construction of new side channels through the floodplains that increased the discharge capacity of the river and offered space for nature. In this context, a program called "*WaalWeelde*" was launched by the University of Nijmegen in 2006 and adopted by the provincial government in 2008 to connect public, private and societal organizations in the planning and implementation phase of river management (Smits, 2009). Based on a bottom-up approach, this integrated multi-player program aimed to develop a safer, more natural and economically stronger riverine landscape.

Unfortunately, the integrated approach of the "*WaalWeelde*" program has not been extended to the maintenance of the floodplains, which remains sectoral. This has resulted in new conflicts (Fliervoet et al., 2013). Increasingly, stakeholders recognized that floodplain management had become a very complex, dynamic and fragmented issue and that more integrated and collaborative initiatives were needed to achieve sustainable floodplain management in the long-term (Fliervoet et al., 2013). This recognition led to the establishment of a taskforce "floodplain management" in October 2011, which aimed to find an integrated, multi-player approach for the maintenance of the newly constructed multi-functional river landscapes, an approach that had been very successful in the early planning and implementation phases. In their final report, the taskforce proposed a new governance structure consisting of a "Waal Board", in which different governmental organizations would cooperate, and new private-private collaborations between land owners and nature conservation organizations, called "Stewardships". Meanwhile, the budgets of the governmental organizations declined, and in 2015, one national governmental organization was even abolished completely: the Government Service for Land and Water Management, which had 960 full time staff (2013 data: www.dienstlandelijkgebied.nl).

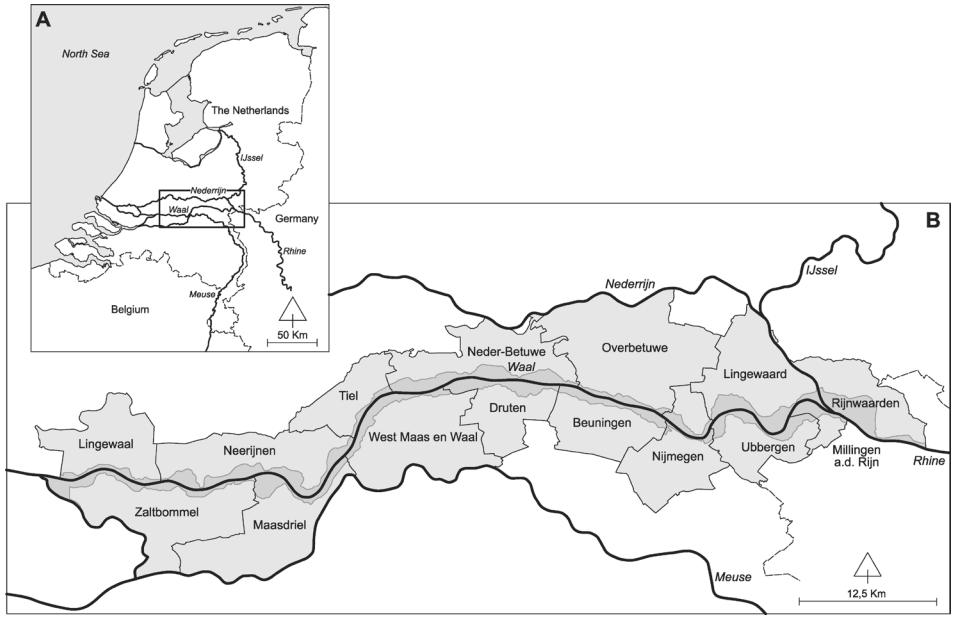

Figure 4.1 | Study area (based on Figure 1 in Fliervoet et al., 2013): (A) location of the *"WaalWeelde"* program in The Netherlands, (B) the specific locations of the fifteen municipalities (light gray) including the floodplain area (dark gray).

4.2.2 Data sources and data collection: selection of stakeholders

In this study organizations were chosen as node level, as in Stein et al. (2011), Ingold (2011) and Knoke et al. (1996). The selection consisted of seventy organizations that already cooperated in the *"WaalWeelde"* program, complemented with knowledge institutions and farmers associations (Fliervoet et al., 2013). The *"WaalWeelde"* program included organizations based on their position, their role in decision process and their reputation (cf. Knoke, 1993). The key actors included governmental organizations, non-governmental organizations, businesses, knowledge institutions and associations of farmers. Finally, the list was checked by the chairman of the *"WaalWeelde"* Taskforce Floodplain Management.

The respondents were selected on the basis of the following criteria: (1) they represent one of the 70 listed organizations; (2) they have a high position in their organization, such as director or manager. With this selection, we ensured that respondents could represent the collaborative relations of their organization. Large organizations were split based on the level of departments or districts.

Respondents were asked by e-mail to fill in a survey about their collaborative relations. This email was followed up by a reminder after two weeks and a phone call after three weeks. The survey consisted of an introduction stating the objective and questions on social characteristics, such as name and function of the respondent, name of the organization, scale of activities, and involvement

or interest in flood protection (blue network) and/or nature (green network). Finally, respondents were asked to select from a list of 70 organizations, the organizations with which they interacted and to indicate the strength (frequency) of their interactions, for flood protection and nature objectives separately. The respondents could add missing organizations to the list. The options given for strength were [1] yearly or less, [2] quarterly, [3] monthly, and [4] on a weekly basis.

Of the 70 initial organizations, two did not exist anymore and four replied they were not involved in floodplain management. Of the remaining 64 organizations, 47 filled in the questionnaires, which constitutes a response rate of 73 percent. Seventeen organizations did not respond, including seven municipalities. Seven respondents added in total seventeen organizations. However, none of these organizations were added by more than one respondent. For this reason, we assume that the original list of organizations included the most relevant actors.

4.2.3 Social network analysis

The survey data were modified before analysis in the software program UCINET (Borgatti et al., 2002). Three organizations were removed from the data because they indicated no involvement or collaborative interests in either flood protection or nature. Secondly, two respondents filled in the survey for the provincial government, therefore one respondent was removed from the data. Ultimately, the data of 43 actors was analyzed regarding collaborative ties.

For the SNA in this paper we used primarily reciprocated collaborative ties, meaning that both actors indicated that they collaborated. Since each tie depends on two actors, the data is more robust to reporting errors (Stein et al., 2011). In case actors indicated different meeting frequencies, the lowest frequency was used. The data was clustered by creating six groups based on the main organizational task or function (Ernoul and Wardell-Johnson, 2013; Prell et al., 2008). These were (1) Flood protection (Fld) (N=6); (2) Nature (Nat) (N=11); (3) Agriculture (Agr) (N=5); (4) Research institutes (Res) (N=5); (5) Special interest groups (NGO / Businesses / Citizens) (Int) (N=9); (6) Coordinators or spatial planning (Crd) (N=7).

Table 4.1 shows the network metrics used in the results section. The networks were analyzed at three levels, i.e. (1) the network as a whole, (2) actor-groups and (3) individual actors.

Table 4.1 | Metrics used

Level	Metric	Definition	Interpretation and references
Whole-network properties	Density	Number of ties in the network divided by the maximum number ties possible (Borgatti et al., 2013).	The density metric analyzes the connectedness of the network, which is also known as network closure (Sandström and Rova, 2010). The higher the network density, the more potential there is for collective action (Olsson et al., 2004). Bodin and Crona (2009) argue that less dense networks have clearly distinguishable subgroups, which could have negative effects on the capacity for collaborative processes among subgroups. However, a very high network density may decrease the groups' effectiveness in collective action (Oh et al., 2004) because this can lead to homogenization of knowledge, which decreases the capacity for solving problems (Bodin and Norberg, 2005).
Whole-network properties	Degree Centralization	The general procedure involved in centralization is to look at the differences between the number of ties a node has (also known as degree centrality) of the most central point and those of all other points. Centralization, then, is the ratio of the actual sum of differences to the maximum possible sum of differences, also known as the approach of Freeman (1979) (Borgatti et al., 2013).	The degree centralization expresses how tightly the graph is organized around its most central point (Scott, 1991) or, put differently, how "star-like" the network structure is (Sandström and Rova, 2010). A low degree centralization value indicates that many actors have spatially centralized positions in the network, which can refer to clearly distinguishable subgroups and a low level of network cohesion (Bodin and Crona, 2009). A high degree of centralization indicates that one or a few actors (when the highest degree centrality is the same for more organizations) are central actors in a star-like configuration, see Figure 1 from Gallemore and Munroe (2013).
Whole-network properties	Cross-boundary exchange	Number of ties connecting actors with different affiliations divided by the total number of connections in the network and expressed as percentage (Sandström and Rova, 2010).	The cross-boundary exchange represents the ratio between collaborative ties within groups and between groups. It is a measure for the network heterogeneity. A low cross-boundary exchange indicates a relatively high tie density within groups (Sandström and Rova, 2010).
Group properties	Group exchange	Reciprocal ties connected to one group divided by the total number of reciprocal ties in the network.	This measure is used to identify dominant groups based on Ernoul and Wardell-Johnson (2013). The groups' exchange (based on the group's ties) within the whole network can be expressed in percentages.
Group properties	Density by group (cross-table)	Density by group is the proportion of actual number of ties and the maximum possible number of ties within and between groups in a cross-table (Borgatti et al., 2013). The diagonal of the cross-table gives single group densities (supplementary data; Table SD-C and SD-D).	The higher the "Density by group", the more potential for collective action between groups (Olsson et al., 2004). Density computed for all pairs of groups indicates mutual strong groups, as opposed to the group exchange, which defines the dominant groups of the total network.

Table 4.1 | continued

Level	Metric	Definition	Interpretation and references
Actor properties	Degree (centrality)	Number of ties of an actor, often distinguishing between reciprocal ties, incoming ties (in-degree) and outgoing ties (out-degree) (Hanneman and Riddle, 2005).	The number of ties an organization has (In-Degree, Out-Degree or reciprocal ties) has been shown to have a positive effect on that organization's influence (Bodin and Crona, 2009), but does not give information on the quality or frequency of the connection (Hanneman and Riddle, 2005). A high number of Out-degree ties can indicate a high degree of dependence on other organization, a high number of In-degree ties can indicate a high degree of dependence by other organizations on the organization, and a high degree of reciprocal ties can indicate a high degree of interdependence.
Actor properties	Betweenness (centrality)	Probability of an organization being on the shortest path between any two organizations in the network.	The actor could act as a bridge between other actors who are not connected otherwise, which allows the actor to influence the information flows and act as a gatekeeper or mediator (Bodin and Crona, 2009). These bridging organizations can play an important role in facilitating cross-scale interactions in environmental management (Rathwell and Peterson, 2012).

4.3 RESULTS

This section presents the results of the social network analysis. First, we present and compare the whole-network properties of the blue and green networks. Subsequently, we focus on the involvement of the six groups of actors and define the most central players in Dutch floodplain management. Finally, we discuss the likely effect of the abolishment of the Government Service for Land and Water Management.

4.3.1 Network characteristics

Table 4.2 presents the social network data describing the whole-network properties of the green and the blue networks, for all frequencies of collaboration and for monthly and weekly collaboration. The blue network for all frequencies consisted of 36 actors with reciprocal ties (out of 43 in total), and the green network of 42 actors (see also Figure 4.2 and 4.3). Even with the higher number of actors, the green network is denser by 30 percent and has a higher degree of centralization. Both networks have a relatively high cross-boundary exchange and all groups are connected to the network, which altogether implies a heterogeneous network.

Table 4.2 | Characteristics of the "blue" (flood protection) and "green" (nature) network based on the reciprocal ties and frequency of collaboration.

	Size (number of nodes)	Density	Degree centralization	Cross-boundary exchange	Total ties
Blue network (all frequencies)	36	0.175	0.516	75.32 %	316
Blue network (monthly and weekly)	24	0.033	0.340	70 %	60
Green network (all frequencies)	42	0.226	0.612	72.06 %	408
Green network (monthly and weekly)	30	0.044	0.403	65 %	80

The density and degree centralization values combined describe how well a network is connected. Both networks are well connected when focusing on all collaborative frequencies (Figure 4.2). The shape of the networks tends to a centralized, wheel or star-like network based on the high degree centralization scores (all tie frequencies). However, the higher degree centralization score of the green network suggests that this network is more centralized.

When focusing on the two highest tie-strength classes (monthly and weekly), both the blue and green whole-network indicators drop. This has a large impact on the connectedness of organizations in both networks, see for example the huge decrease of total ties. Additionally, twelve organizations drop out of the blue and green network on top of the already disconnected actors, especially actors of the research, agriculture and special interest group (Figure 4.3). Figure 4.3 also shows the large decrease of collaborative ties between the flood protection and nature group in both networks and the increase of the importance of Crd1, the Government Service for Land and Water Management. This actor holds the majority of the weekly reciprocal ties (thick lines in Figure 4.3) and all remaining ties with the agricultural group. In both networks, the collaborative ties of the special interest group focus almost completely on organizations in the nature group. The organizations with a nature interest stay well connected in the green network, in spite of focusing on the more frequent collaborations, except actor Nat10 (Foundation *"Lingewaard Natuurlijk"*), which got disconnected.

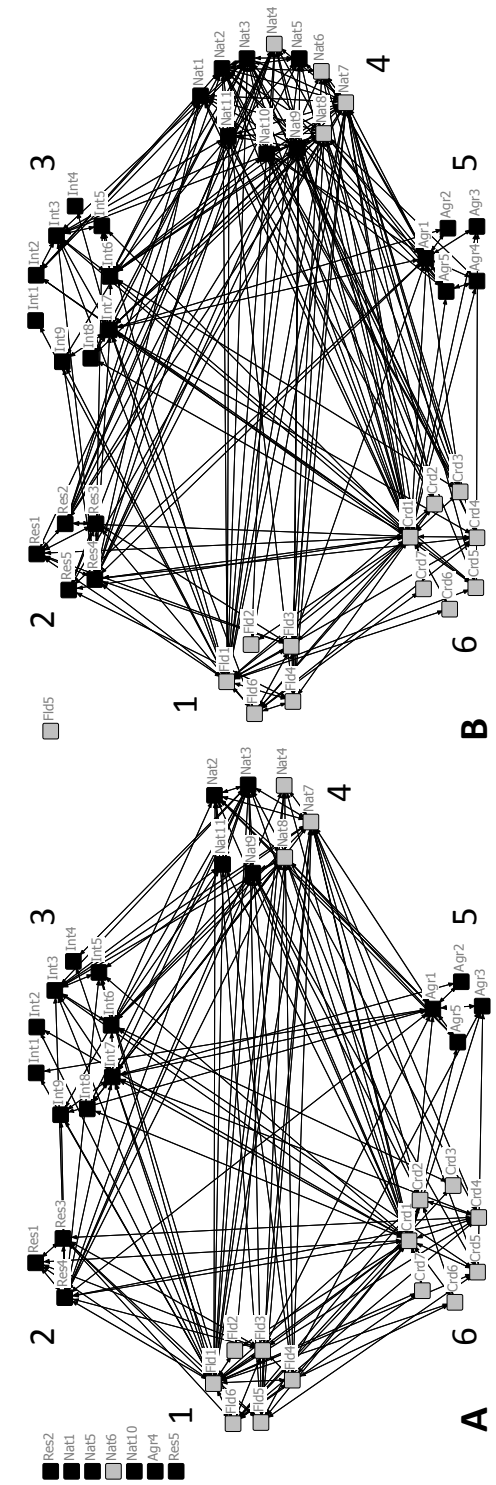

Figure 4.2 | Social networks based on **all** reciprocal ties concerning flood protection objectives (A) and nature objectives (B). A gray node indicates a governmental organization and a black node a non-governmental organization. Numbers indicate the task or function of the six groups: (1) flood protection; (2) research institutes; (3) special interest groups; (4) nature; (5) agriculture; and (6) coordination or spatial planning.

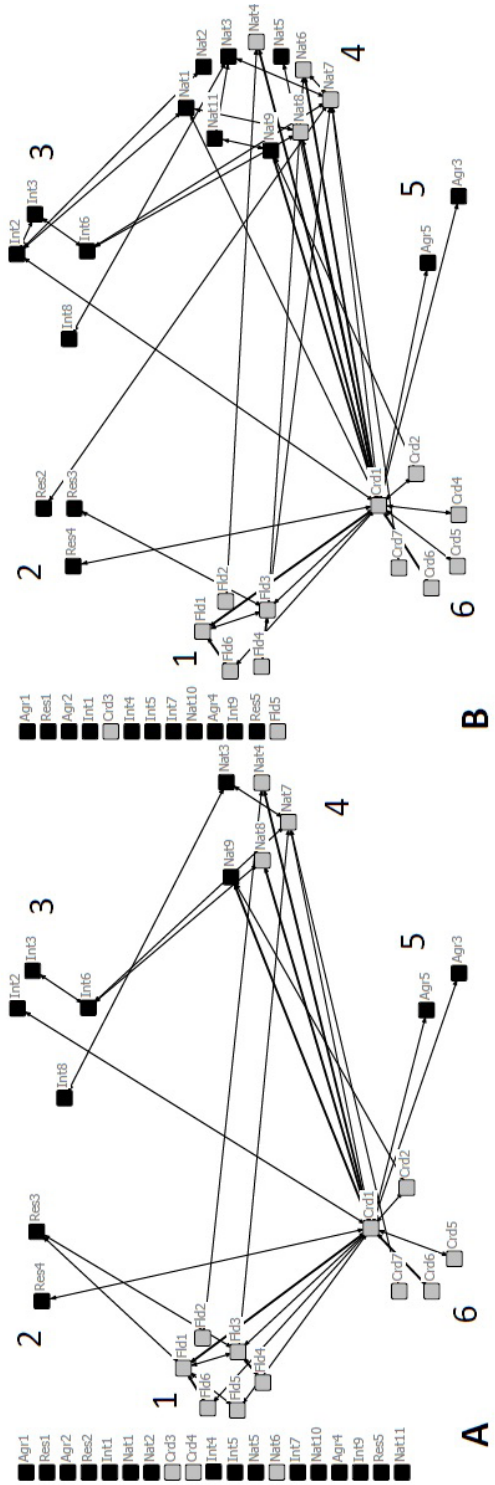

Figure 4.3 | Social networks based on the **monthly and weekly** reciprocal ties concerning flood protection objectives (A) and nature objectives (B). Bold lines indicate the weekly ties. A gray node indicates a governmental organization and a black node a non-governmental organization. Numbers indicate the task or function of the six groups: (1) flood protection; (2) research institutes; (3) special interest groups; (4) nature; (5) agriculture; and (6) coordination or spatial planning.

4.3.2 Specifications of the groups' involvement

When we distinguish between governmental and non-governmental actors, we can clearly see the importance of the former (Table 4.3). While the number of government actors is smaller, they still account for 46 percent (green network, all frequencies) to 75 percent (blue network, monthly and weekly collaboration) of all ties. Flood protection and coordination of spatial planning are core government tasks, while nature is more a mixed governmental and non-governmental responsibility (Figure 4.2). Government becomes even more important when low frequency ties are removed (Table 4.3 and Figure 4.3).

Table 4.3 | The group exchange of the governmental and non-governmental organizations involved in the blue and green networks (in percentages). Additionally, the density within the group is also indicated (see supplementary data for organizational attributes).

Group number	Type of organization	Blue network (all frequencies)	Blue network (monthly and weekly)	Green network (all frequencies)	Green network (monthly and weekly)
1	Governmental organizations (N= 17)	54 (density = 0.382)	75 (density = 0.125)	46 (density = 0.346)	65 (density = 0.140)
2	Non-gov-ernmental organizations (N= 26)	46 (density = 0.123)	25 (density = 0.006)	54 (density = 0.197)	35 (density = 0.022)

Almost all groups are well-connected to each other when all tie strengths are included (Figure 4.2). However, the flood protection and agricultural group show little collaboration between each other in either the blue or the green network. In addition, Figure 4.2 shows the higher number of collaborative ties between the nature group on the one hand and the coordination and research group on the other in the green network as compared to the blue network.

Table 4.4 shows the actors grouped by their main tasks. In the blue network, the actors with interest in flood protection and nature have the highest degree of group exchange. Focusing on monthly and weekly ties only, the group exchange of actors responsible for coordination or spatial planning activities increases at the expense of research institutes and special interest groups. The green network shows a different pattern, with a high group exchange for the actors of the nature objective (36 percent) and a lower group exchange for flood protection compared to the blue network. The actors involved in a coordinating role show a similar increase in group exchange when focusing on the stronger ties representing monthly and weekly collaborations, emphasizing their relative importance in the whole network.

Table 4.4 | The group exchange in the blue and green networks (in percentages).

Group number	Main interest	Blue network (all frequencies)	Blue network (monthly and weekly)	Green network (all frequencies)	Green network (monthly and weekly)
1	Flood protection (N= 6)	22	27	13	16
2	Nature (N= 11)	24	22	36	35
3	Agriculture (N= 5)	7	3	8	2.5
4	Research (N= 5)	9	5	11	4
5	Special interest groups (N= 9)	18	10	15	12.5
6	Coordinators or spatial planning (N= 7)	20	33	17	30

The group density is higher within groups than between groups, especially in the green network (supplementary data; Table SD-C and SD-D). The coordinating group is an exception here, their highest tie density shifts along with the issue at stake (flood protection or nature), so the coordination group interacts most strongly with flood protection group in the blue network, and with the nature group in the green network. This applies also to the group of nature organizations, where the highest density scores are reached with the flood protection group in the blue network and with each other in the green network. Moreover, the group density scores show strong connections within the flood protection group and the low density scores among the organizations in the special interest group, which classifies this as weak connected group.

4.3.3 The central and influential organizations

The most central organizations in the blue and green network have been determined based on their number of reciprocal ties (degree centrality) and the amount of incoming ties (In-degree centrality) (supplementary data; Table SD-A and SD-B). The major difference between the two is that reciprocal degree shows mutual recognition while the In-degree values show the recognition of a collaborative actor by others only. In addition, the betweenness values for each actor are analyzed to identify bridging organizations.

The governmental actor Crd1 *(Government Service for Land and Water Management)* has the highest number of reciprocal and In-degree ties and the highest betweenness scores in both networks, except for the number of In-degree ties in the blue network, in which case it holds a third place (28 and 34 reciprocal ties in the blue and the green network respectively). Crd1 is the major broker among the coordinators of spatial planning and between this group and all other groups, especially the nature and flood protection group. Its central position and the bridging role are clearly visible in Figure 4.3.

In the blue network the second place, based on the number of reciprocal ties, is occupied by Fld 1, the *Delta Program*, with 27 reciprocal ties. This governmental actor was designated as the most important

collaborative organization by the others (In-degree value). Fld1 is responsible for finding common ground for future flood protection measures to deal with climate change. So, collaboration between various actors is required, but also recognized by the others. In the green network, the second place is held by Nat7, the State Forestry Service, with 24 reciprocal ties. Also the betweenness value is relatively high, which expresses the influential role of the State Forestry Service (supplementary data; Table SD-B).

The actor Fld3, State Water Agency, is by mandate an important actor in river management with important management tasks and regulatory powers. It takes second place in terms of the number of In-degree ties in both networks, which shows that it is recognized by the other actors, but the ties are not reciprocal: the State Water Agency itself recognizes only a limited number of actors as collaborators. This suggest an unequal relation. Similarly, the Water Board (Fld6) appears in the top 5 for number of In-degree ties in both the blue and green network, but not for reciprocal ties. They also do not have an important bridging or coordinating function, according to their low betweenness scores.

Surprisingly, given its mandate, the actor Nat6, *province of Gelderland,* is not in the top 10 of reciprocal ties in both networks. It only scores relatively high with respect to In-degree ties in the green network, possibly because it holds some regulatory powers concerning nature protection.

4.3.4 Discontinuation of the most central actor

Due to state budget cuts, the Government Service for Land and Water Management (Crd1) has been abolished on 1 March 2015. The effects of removing this governmental actor can be seen by comparing Figure 4.3, which shows the situation until 1 March 2015 (reciprocal ties, weekly or monthly), with Figure 4.4, in which we have removed Crd1. Assuming everything else remaining the same, all farmers' associations and many other organizations will become isolated and in fact drop out of the networks. In total, six organizations will drop out of the blue network and seven out of the green network. The bridging function of Crd1 between the flood protection and nature group will be lost. Especially the blue network will become very fragmented; the green network will still be held together by the group with a nature affiliation.

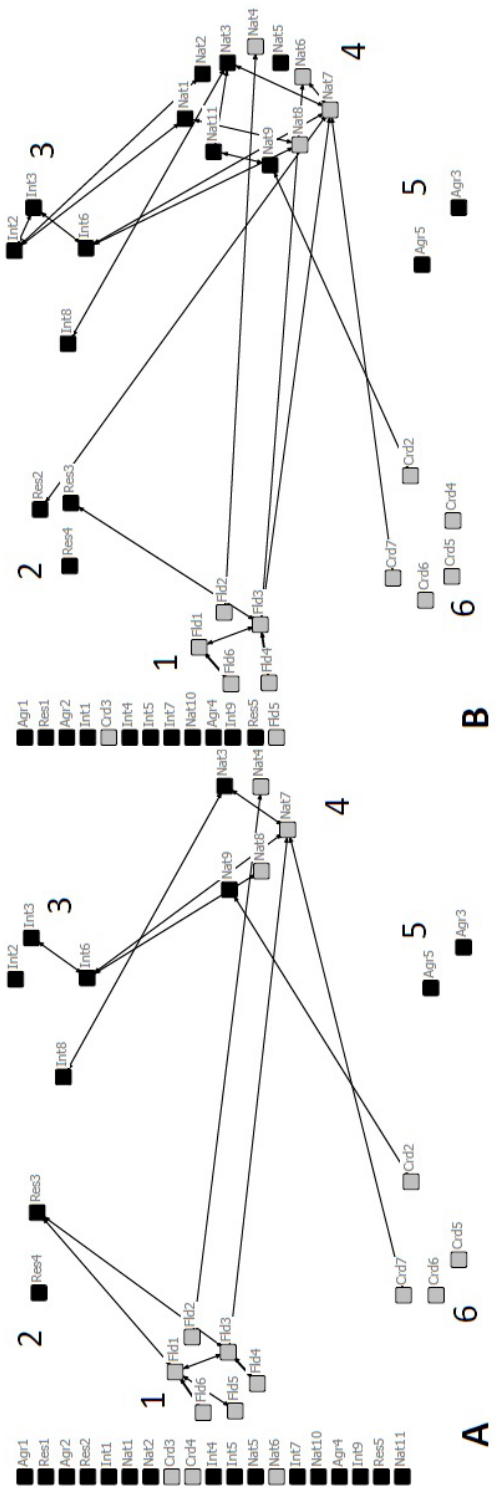

Figure 4.4 | Social networks based on the **monthly and weekly** reciprocal ties concerning collaboration on the blue (A) and green network (B) after removing Crd1. Bold lines indicate the weekly ties. Gray nodes indicate a governmental organization and black nodes a non-governmental organization. Numbers indicate the tasks of the six groups: (1) flood protection; (2) research institutes; (3) special interest groups; (4) nature; (5) agriculture; and (6) coordination or spatial planning.

4.4 DISCUSSION

4.4.1 Complexity of collaborative floodplain management

In the article two networks for maintaining floodplains were analyzed, one with a focus on flood protection and the other on nature, in order to increase insight in the complexity of natural resources management and the alleged changed role of government. The analysis has shown, first, that both the blue and green network are well-connected and heterogeneous networks, with complex structural patterns. Cross-boundary exchange (75 and 72 percent respectively), network density and degree centralization are relatively high compared to other studies (Sandström and Rova, 2010; Stein et al., 2011).

The relatively high network density improves the potential for collective action and collaboration (Olsson et al., 2004) because well-connected networks facilitate communication, foster mutual trust, and help to prevent or manage conflicts (Bodin et al., 2006). Sandström and Carlsson (2008) showed that high tie-density promotes joint-action, especially when many ties exist between different types of actors (e.g. between recreational fishermen and governmental officials). The green network has a higher network density than the blue network, indicating a greater potential for collective action on nature issues. The high ratio of relationships between different types of actors can be observed in both the blue and the green network, even for monthly and weekly ties.

The high density of the networks may also have some adverse effects. An actor with too many ties may feel obligated to please all or most of its collaborative partners. This may reduce the actor's possibilities for action (Bodin and Crona, 2009) and slow down progress, resulting in "partnership fatigue" (Huxham et al. 2000, p. 347). Moreover, a tangle of collaborative ties may reduce transparency and accountability (Huxham et al., 2000). In addition, a dense network implies relatively few contacts with outsiders that may have different points of views. This may reduce the capability to innovate (Bodin and Norberg, 2005).

4.4.2 The dense green network and the role of nature organizations

The size of the green and the blue network indicate that mutual recognition of collaborative partners is stronger in the former than in the blue network (42 versus 36, Table 4.2, based on reciprocal ties). The organizations not included in the blue network were mostly organizations with a main interest in nature objectives or research institutes with an ecological interest.

The clustering in groups is supported by the high group density scores within the groups. In the blue network, three groups play an equally dominant role, flood protection, nature and coordination actors, especially when we focus on weekly and monthly ties. The green network is, perhaps not surprisingly, mostly dominated by the group of nature organizations, which collaborate a lot with the coordinating group and research institutes.

Overall, the respondents believed more strongly in the added values of collaborative partnerships for nature objectives than for flood protection objectives, reflected in the higher green network density. There are several explanations for this:

- The management of the flood protection objectives could be seen as a governmental issue, while interest for nature conservation and restoration issues is more spread and recognized by non-governmental organizations.
- Nature organizations need (strong) partnerships to reach their objectives (Warner and Van Buuren, 2009), whereas water agencies have strong regulatory powers and their own funding.
- Nature organizations have much more experience with collaborative processes than water agencies (Koontz and Thomas, 2006).

4.4.3 Central actors

Analysis of the most intensive collaborative ties identified the weak relationship between the nature and flood protection organizations as shown by the few weekly and monthly ties between the two groups (Figure 4.3). To our knowledge, this has not yet been formally analyzed for floodplain management, although the fragmented governance of Dutch floodplains is "general knowledge" (Fliervoet et al., 2013; Wiering and Van de Bilt, 2006).

In both networks the most central organization based on degree centrality is the Government Service for Land and Water Management (Cdr1), a national governmental organization established for coordination, collaboration and implementation of spatial planning, i.e. a bridging organization (Berkes, 2009). The central position of Cdr1 in both networks makes the organization a perfect candidate to facilitate the idea of public-public collaboration (Waal Board, see paragraph 2.1). Unfortunately, in the beginning of 2015 this organization was disbanded due to national state budget cuts. The second most influential role is designated to the Delta Program (Fld1) in the blue and the State Forestry Service (Nat7) in the green network. These organizations have a much influence on the current collaborative network and could act as bridges between other actors who are not connected otherwise, given their betweenness value (Bodin and Crona, 2009).

It is remarkable that the main authorities for nature were not recognized as important collaborative partners (reciprocal ties): they were not even in the top-10. The provincial government (Nat6) only recognized a couple of collaborative partners within the green network. In addition, their recognition by other actors (In-degree ties) is also relatively low for a main authority. Their low ranking is probably caused by the recent decentralization of the nature policies from the ministry of Economic Affairs to the provincial governments in 2014, which was maybe not yet fully recognized by all actors. In contrast, the well-established State Water Agency (region East) (Fld3) was recognized as an important collaborative partner by many others (top-2 position based on In-degree ties), but did not reciprocate this recognition. This low ratio of in- versus out-degree ties shows the power and independence of the State Water Agency and also the provincial government: they do not need

the other organizations to implement their policies and select only a small number of collaborative partners. To a lesser extent this also applies to the position of the Water Boards.

4.4.4 The consequences of removing a central, governmental actor

The states' discontinuation of the most central governmental organization (Cdr1) will most likely have a large impact on the current collaborative structures, especially on the flood protection network. Assuming all else remaining the same, both structural integration and inclusiveness (Lockwood et al., 2010) will decline. Farmers' associations and spatial planning agencies (municipalities) will become disconnected. The number of links between different groups, especially the nature and flood protection group will decrease. This may not only reduce opportunities for collective action, but also make floodplain maintenance less integrated (Lockwood et al., 2010). According to Lauber et al. (2008) it may reduce the exchange of ideas, decrease the access to funding, and reduce the influence of certain stakeholders. Exchange of ideas through the whole network is hampered by less network cohesion, whereas in particular the municipalities and associations of farmers will be disempowered by the loss of the bridging function of Cdr1. Crd1 no longer brings together diverse goals which will constrain the funding opportunities, especially funding for nature, which depends on third parties as it is often coupled with other goals.

4.4.5 Implications for the government's role

Our data indicates that different groups of interest are connected, but it also supports the idea that governmental organizations still control and occupy central positions in the network, like in United Kingdom (Watson et al., 2009, see introduction). This challenges the alleged shift from (hierarchical) government to (collaborative) governance. Yes, there is a lot of collaboration, but there is also still a lot of hierarchical government. The question is whether this is necessarily bad and whether it could be different. Government can play different roles in collaborations. Government bodies can be an active participant and use its regulatory powers to implement its own policy and reach its own objectives; it can coordinate and facilitate, like Crd1 did; and it can stimulate collaboration hierarchically, for instance by changing the rules, selectively empowering collaborators with fewer resources, and threatening to impose regulation if no results are achieved (cf. the "shadow of hierarchy": e.g. Börzel and Risse, 2010; Héritier and Lehmkuhl, 2008). If government takes on the first role and tries to run the show on its own, it could frustrate collaboration , but if it takes on the second or third role, or both, it could potentially stimulate collaboration. In any case, government still is important and most likely will remain so.

Because of the importance of government, attempts to improve the maintenance of the Dutch floodplains should involve the governmental organizations. Watson et al. (2009) argue that there is a greater need to recognize the integration of land and water management at the local scale and to develop appropriate institutional arrangements for both policy making and policy implementation. In our case, both the green and the blue networks rely on similar collaborative relationships. This offers opportunities for integrating the maintenance of flood protection and nature objectives at the local level and to collaboratively develop an appropriate policy for sustainable floodplain

management. The basic idea is that a collaborative forum of governmental organizations at higher levels can support on-the-ground efforts of local groups (Margerum, 2007).

The discontinuation of Cdr1 creates an opportunity to simplify and restructure the network to ultimately achieve a better integration of flood protection and nature management in floodplains. At the local or regional level, a coordinating or facilitating role could be played by the State Forestry Service (region East), mainly based on their central position in both networks. However, a coordinating or facilitating role demands for an actor with a wide and a more or less neutral perspective on the maintenance issues. These requirements seems to fit better with the tasks and function of the provincial government rather than the State Forestry Service (region East), as well to keep the distance between European and national policies and local actors as small as possible.

Another candidate to take on a coordinating role would be the Delta Program (Fld1), which holds the second and third most central position in respectively the blue and green network. The Delta Program started in 2009 as a collaborative program involving public and private organizations, but it is now responsible for a yearly, returning program to improve the flood protection levels and ensure fresh water supply in the context of climate change. Despite their main focus on water and planning, they have the capacity to develop an integrated, long-term maintenance vision for the floodplains. These ideas should be studied more in-depth to prove the feasibility. In the end, there would be one collaborative network concerning floodplain management.

Still, it is worth emphasizing that effective collaborative governance requires that governmental organizations do not become too dominant and recognize others as collaborative partners. This is an important factor, alongside the need for sharing responsibilities and knowledge, flexibility, building trust and setting up learning environments for collaborative governance (Emerson and Gerlak, 2014). In other words, collaborative governance cannot be achieved without a change of thinking and acting of the central government and its executive agencies (Watson et al., 2009).

4.5 CONCLUSIONS

In sum, this study demonstrated the complexity of collaborative relationships based on a case study on the maintenance of the Dutch floodplains, using a social network approach. The complexity was explored by focusing on the networks regarding two conflicting issues: flood protection and nature. The organizations in both networks are well-connected and diverse in terms of goals, whereby the nature organizations possess the most collaborative ties. The dense green (nature oriented) network includes more organizations and collaborative relationships than the blue (flood protection) network. This indicates that the potential for collective action is higher in the green network. Analysis of the most frequent relationships (monthly and weekly ties) showed that few frequent collaborative ties existed between flood protection and nature groups.

The most central organization in both networks was Crd1, a governmental organization focused on coordinating land and water management. This organization had links with many different interest groups and played an important bridging role between the nature and flood protection oriented organizations. Quite remarkably, this organization has been abolished early 2015 due to state budget cuts in a time period where collaboration is framed as a solution. Removing a central actor from a dense network will have consequences, especially in this case. Assuming all else remaining the same, the structural integration of both networks will decrease, especially the bridging function of Crd1 between the water agencies and nature organizations will be lost. Additionally, groups, such as the associations of farmers and municipalities will become disconnected, which may decrease their participation in and influence on decision making. On the positive side, the discontinuation of coordinating governmental actors will give opportunities to simplify and restructure the complex collaborative network, for example through a more facilitating role of the provincial government, who could support on-the-ground efforts of local groups.

In both the blue and green networks, governmental actors have the highest number of reciprocal ties and dominate the collaboration. The powerful and independent role of the main authorities can be deduced from the differences between the number of in-coming and out-going ties, reflecting recognition *by* others and *of* others respectively. Therefore, we argue that currently there is no shift from *"government to governance"* with respect to the maintenance of the Dutch floodplains. To achieve more collaborative governance, new collaborative relationships have to be developed, which requires time, effort and recognition of non-governmental actors as full partners.

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CHAPTER 5

A stakeholder's evaluation of collaborative processes for maintaining multi-functional floodplains: a Dutch case study

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ABSTRACT

All over the world, governments have established integrated river basin management projects on local and regional scales to combine functions, such as flood protection, nature restoration, and other potentially conflicting land uses (e.g. recreational and agricultural activities). This has led to collaborative arrangements between diverse administrative levels, sectors and actors in the planning and implementation phase. Following the finalization of the implementation phase, a new floodplain maintenance phase is called for. Maintaining multi-functional floodplains involves, for example, monitoring, the development of ecological infrastructure and the coordination of maintenance activities. This paper addresses how collaborative processes continue and are further shaped in the maintenance phase. Regional stakeholder's frames were examined with respect to the following components: incentives, collaborative process, allocation of tasks including related responsibilities, and outcomes. Analysis of an unsuccessful case study indicates that the collaborative processes on the organizational and action levels were insufficiently connected, because of the lack of a strategy to integrate the outcomes of both processes. Moreover, underlying conflicting perspectives on collaborative maintenance, an economic perspective versus a perspective of collaboration with a platform of local nature organizations, obstructed effective collaborative governance aimed at maintaining multi-functional floodplains.

5.1 INTRODUCTION

During the last few decades, river management has been guided by newly introduced governance approaches, because of the need to integrate scales, actors, and sectors (e.g. Imperial, 2005; Robinson et al., 2011; Dewulf et al., 2015; Plummer et al., 2016). One example of these new approaches is collaborative governance, which is defined as the processes and structures of public policy decision-making and management existing between governmental, non-governmental, and/or civic actors that create public services and values (e.g. Emerson et al., 2012). This approach, as well as related concepts such as environmental governance (Evans, 2012) and adaptive governance (Folke et al., 2005; Stringer et al., 2006), are characterized by a shift from hierarchical and well-regulated forms of government towards less formalized governance through the utilization of stakeholder networks that extend beyond the government sector (Huitema and Meijerink, 2014). All these governance approaches refer to a collaborative form of river management, which can be applied in integrated river basin management. Rijke et al. (2012, p. 371) defined integrated river basin management *"as a comprehensive water management approach that aligns multiple objectives in a river basin across different spatial scales and temporal dimensions"*. This integrative approach is similar to management approaches, such as integrated water resources management (Jusi, 2009) and integrated watershed management (Blomquist and Schlager, 2005), but differs in the focus on rivers and their floodplains, in other words, the river basin scale. Projects and programmes based on integrated river basin management are visible in, for example, Europe and North America (Warner et al., 2013). In 2005, a strategic programme "Making Space for Water" was launched in England that aimed to create win-win solutions for flood defense and riparian ecology (Potter, 2013). In the Netherlands, the integrated and collaborative approaches are reflected in the national implementation programme called "Room for the River" (Rijke et al., 2012). This programme led to a shift from the former one dimensional agricultural function to multi-functional floodplains, that combine flood protection, nature restoration, the mining of sand and clay, recreation and agricultural (Pahl-Wostl, 2006).

The almost completion of the planning and implementation phases of the above-mentioned programmes calls for the initiation of a new maintenance phase. The planning and implementation phases resulted in land-use changes, while the maintenance phase should address monitoring, the development of ecological infrastructure, and the coordination of maintenance activities. However, it is uncertain how collaborative governance should continue and develop during the maintenance phase. It is accepted among stakeholders that the maintenance phase forms an important aspect of integrated river basin management; however, his phase has traditionally received little attention from policy-makers. For example, the realization of the Room for the River project near Nijmegen, where a new island was created by digging an artificial side channel, is politically more interesting. Additionally, the maintenance phase is confronted with long-term visioning and a collaborative process that often exceeds the standard government four-year term. The need for collaborative maintenance is stressed by declining state budgets, single-goal-oriented maintenance activities and fragmented land ownership (Fliervoet et al., 2013).

In the maintenance phase, governmental organizations require new collaborative arrangements in the decision-making process in order to sustain the multi-stakeholder approach adopted in the planning and implementation phase. Researchers and practitioners argue that only improving coordinated arrangements is not sufficient to realize integrated river basin management (Watson, 2004; Warner et al., 2016). The emergence of collaborative arrangements creates new challenges, for example, the need to resolve conflicts that arise when stakeholders are driven by different incentives or expectations with respect to the collaboration (Leach et al., 2002). Other sources of potential conflict are the differing functions of floodplains that different actors promote. For example, water managers may want to remove vegetation for flood safety reasons, while nature managers may pursue a non-interventionist approach which allows spontaneous nature development, a strategy which is reflected in legislation such as the European Natura2000 policy. This issue is referred to as the *"nature-safety"* dilemma (Vreugdenhil, 2010). Studies have also highlighted a need for greater understanding of stakeholder's frames on the allocation of tasks and related responsibilities during the planning of collaborative river management processes (e.g. Curtis et al., 2002; Parker et al., 2010). Moreover, researchers have identified a series of factors that are crucial to the collaborative process itself, such as building trust, face-to-face dialogue, flexibility, leadership, and the setting up of learning environments for collaborative governance (Ansell and Gash, 2008; Emerson and Gerlak, 2014).

This article contributes to a better understanding of the challenges posed by collaborative governance as perceived by stakeholders on a regional and local scale in river management by making use of a case study in the Netherlands. The aim of this article is to explore the different perspectives and interpretations of stakeholders by using a framing approach regarding the function, division of responsibilities between public and private actors and the stakeholder's lessons learned from the collaborative processes applied when maintaining floodplains. Framing methodologies are applied in a wide range of disciplines and are "generally focused on studying the various ways in which people strategically make sense of reality and how they add meaning to ambiguous and complex situations" (Van den Brink, 2009, p. 35). Different underlying perspectives often prevent stakeholders from finding common ground (Gray, 2004) and thus form an obstacle for shared understanding. Understanding stakeholder frames will provide insights into how stakeholders envision their responsibility in floodplain management, the complexity of collaborative governance, and ultimately how stakeholders resolve conflicts of interests.

In a Dutch case study attempts were made to initiate a new collaborative approach on a local scale that aimed to maintain the multiple functions of the *"Rijnwaardense Uiterwaarden"* (Rijnwaardense floodplains). Ultimately, stakeholders were unable to apply integrated and collaborative floodplain management which created opportunities to gain insights into current challenges and provided lessons for the future. The case study describes two collaborative processes. The first, the Coordination Council, is a platform that facilitates communication between governmental organizations and private land owners on an organizational level. The Coordination Council is concerned with collective choices, the tuning of organizational programmes, and is tasked with finding a shared

maintenance vision for the *"Rijnwaardense Uiterwaarden"*. The second process, occurring on the action level, was a collaborative platform existing between local nature managers (hereafter referred to as the Stewardship), and was initiated and facilitated by governmental organizations to operationalize integrated floodplain management based on the council's maintenance vision. Despite both collaborative processes leading to a consensus about integrated maintenance visions and action plans, the implementation of these plans was prevented by the governmental organizations. To gain further insight into the implementation gap that occurred between these two collaborative platforms, we refined our research aim by posing three specific research questions:

1. How do stakeholders reflect on their incentives, the collaborative process itself and the intermediate outcomes resulting from the processes of the Coordination Council and the Stewardship?
2. Which lessons are learned among the stakeholders with respect to both collaboration processes and their interdependency?
3. How do stakeholders allocate public and private responsibilities for maintenance tasks and how will this affect future collaborative governance?

Answering these questions will lead to a deeper understanding of the present challenges to the continuity of collaborative governance in the maintenance phase of river management. In this article we use the term floodplain management when referring to the maintenance of multi-functional floodplains.

5.2 THEORETICAL FRAMEWORK

5.2.1 Collaborative governance and components of the collaborative process

The term collaborative governance is defined by Emerson et al. (2012, p. 2) as: *"the processes and structures of public policy decision making and management that engage people constructively across the boundaries of public agencies, levels of government, and/or the public, private and civic spheres in order to carry out a public purpose that could not otherwise be accomplished"*.

In other words, collaborative governance refers to a negotiation process between diverse stakeholders that aims to establish collective goals or shared understanding (e.g. Margerum, 2011). Studies recognize diverse components that need to be understood before analysis of the collaborative process is undertaken (Selin and Chavez, 1995; Ansell and Gash, 2008; Emerson et al., 2012). Literature distinguishes three, highly simplified, collaborative components: (1) starting conditions (antecedents); (2) the collaborative process itself, including the problem setting, direction setting and structuring components defined by Selin and Chavez (1995); and finally (3) outcomes. All these components are essential for the establishment of collaborative initiatives to maintain floodplains. This is particularly true of the maintenance phase as new potentially conflicting interests become apparent at this stage. In particular, the interests of local nature conservation organizations, land

owners and farmers, who combine agricultural activities with nature management on their property, are added during the maintenance phase (Fliervoet and Van den Born, 2016). These new interests emerge because maintenance tasks and activities often include all floodplain areas on a local scale, including locations where no management interventions were carried out. Studies also indicate that collaboration occurring at different levels needs to be taken into account when analyzing collaborative processes (Imperial, 2005; Margerum, 2008). Margerum and Robinson (2015) distinguished three levels of collaboration in water management; (1) policy level; (2) organizational level; and (3) action level. Both collaborative processes included in the Dutch case study deal with the same floodplain area, but occur at different levels of collaboration. The Coordination Council acts at an organizational level, while the Stewardship attempts to implement the council's maintenance vision at an action level.

Figure 5.1 shows the diverse collaborative components of both collaborative platforms. Starting conditions include an analysis of stakeholder's incentives and pre-existing associations because previous collaborative failures involving the same stakeholders can result in low initial levels of trust and poor relationships, complicating new collaborative efforts (Ansell and Gash, 2008).

The components of the collaborative process are actualized during face-to-face dialogue between stakeholders and the iterative and dynamic negotiation process. Emerson et al. (2012) and Ansell and Gash (2008) define diverse stages of collaboration that stakeholders have to traverse, such as trust building, commitment to the process and shared understanding. Many studies argue the importance of building trust between stakeholders as a prerequisite to an effective and successful collaborative process (e.g. Huxham and Vangen, 2005; Reed, 2008). Additionally, successful collaboration is dependent on the presence of an effective coordinator or facilitator (Leach and Pelkey, 2001). In the context of collaborative governance, studies emphasize the re-distribution of responsibilities among complex networks of private and voluntary or community organizations (Watson, 2004; Ansell and Gash, 2008). Ansell and Gash (2008) explain this shift by using the concept of "shared ownership of decision-making", which implies shared responsibilities. However, the shift towards shared ownership also creates new dilemmas because stakeholders have to make collective decisions with other stakeholders who may hold a conflicting perspective (Ansell and Gash, 2008). Moreover, public and private organizations have overlapping responsibilities and tasks, and studies expect that a collaborative approach offers opportunities to reduce duplication, reduce conflict and to share data and expertise (Gray, 1989).

If the above-mentioned issues are addressed, stakeholders apply the outcomes of the collaborative process to derive benefits by formulating and implementing collective agreements. According to Watson's (2015a, p. 60) outcomes "are actual consequences and benefits such as improved environmental quality, reduced conflict, enhanced knowledge and problem-solving capacity, and more efficient or equitable use of natural resources". In the "*Rijnwaardense Uiterwaarden*" case presented here, the attempted collaboration resulted in no shared action, preventing efficient floodplain management. Therefore, we will focus on the outcomes of both collaborative processes.

Because collaborative processes are interactive and influence each other, this chapter also analyzes the interaction between the two collaboration levels, which is represented by a feedback arrow, originating at the outcomes box on the action level and leads to collaborative process box on the organizational level (Figure 5.1).

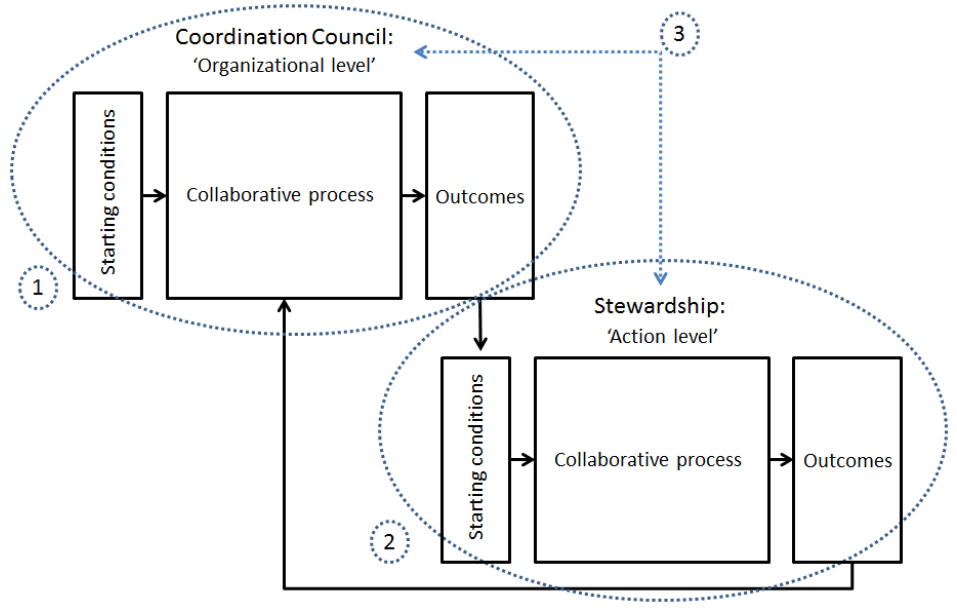

Figure 5.1 | Analytical framework: a simplification of the collaborative governance model (starting conditions, collaborative process and outcomes) combined with two levels of collaborative partnerships. The stakeholder's lessons learned are presented by the broken circles and lines and refer to the three processes: (1) the Coordination Council, (2) the Stewardship, and (3) their interaction.

5.2.2 Frames

Literature indicates that collaboration is a distinct type of process that is complex, dynamic, iterative, and unpredictable, therefore many studies emphasize the importance of exploring different perceptions, understandings or frames in collaborative settings (Termeer, 2009; Dewulf et al., 2011; Watson 2015b). During collaborative processes diverse stakeholders work together, often tending to frame the issues at hand in very contrasting ways by defining "what this is all about" differently (Dewulf et al., 2007). According to Weick (1995), a frame can be understood as a sense-making device. In this article, the theory of framing is used to elucidate frame differences or alignments regarding components of the analytical framework (Figure 5.1). The theory of framing developed in the domain of multi-actor collaboration is used (Gray, 1989; Hardy et al., 2005; Dewulf et al., 2011). This framing approach reveals how stakeholders frame problems and give meaning to issues experienced during conflicts that arise as a result of, for example, fragmentation of maintenance activities and conflicting policies.

Stakeholder's frames with respect to incentives, the collaborative process, intermediate outcomes and the lessons learned by them are analyzed. Because multi-stakeholder collaboration is also about learning how to cope with and take advantage from diversity (Leach and Pelkey, 2001; Raadgever et al., 2012). For example, stakeholders may have different perceptions of what the main problems are, what is at stake and which goals should be achieved, which may provide a source of uncertainty in the collaborative process (van der Keur et al., 2008). Additionally, stakeholders may also hold frames about themselves, others and relationships (Dewulf et al., 2009). Relationship frames are derived from the stakeholder's evaluation of the process, in particular on the development of mutual trust, and the stakeholder's assessment of public and private responsibilities regarding maintenance tasks. Finally, stakeholders hold frames relating to the interaction process between themselves during conflict, such as frames on how conflicts should be managed (Dewulf et al., 2009). Overall, "conflict may not be resolved if frames are ignored and reframing is lacking" (Mostert et al., 2008).

5.3 METHODS

To explore stakeholder's frames with respect to collaborative floodplain management, a case study of an unsuccessful collaboration attempt was undertaken where a failure to establish collaborative agreements to maintain floodplains occurred. The case study approach is a useful method that facilitates the description of phenomena, such as complex collaborative processes, within a real-life context where the researcher has little control over the process itself (Baxter and Jack, 2008). Our case study, the *"Rijnwaardense Uiterwaarden"*, provides a source for analysis in which different expertise, diverse stakeholder issues and divergent sectoral perspectives combine with the aim of maintaining floodplains.

5.3.1 Historical context of the case study

In 1993 and 1995, the Netherlands experienced a near flood of its major rivers that could have been catastrophic for society and economy. In 1995, more than 200,000 citizens were evacuated as a precautionary measure (Warner, 2008). These events and the release of the *"Gelderse poort"* development plan in 1995, in which nature restoration of floodplains became a central issue in the Netherlands, strongly influenced the redevelopment plan for the *"Rijnwaardense Uiterwaarden"* (Figure 5.2). The *"Rijnwaardense Uiterwaarden"* plan incorporated the development of 500 hectares of new riparian nature and an increase in the discharge capacity of the area to a peak discharge capacity of 16,000 m^3/s from 15,000 m^3/s. Subsequently, this autonomous project element became part of the Room for the River programme (Rijke et al., 2012). In an effort to incorporate cultural and landscape values, the first draft plan was presented for consultation with land owners and local society in 1999. The draft plan also included a vision for project maintenance. Subsequently, the project was divided into six subprojects based on land ownership in an effort to operationalize the development plan. Two subprojects were led by Rijkswaterstaat (Directorate for Public Works and Water Management), that is, the executive agency of the Ministry of Infrastructure and the Environment. Two subprojects were led by two different sand and clay mining companies (private

land owners) and a further two subprojects were led by the now disbanded government Service for Land and Water Management; an agency of the Ministry of Economic Affairs. The project remained static until 2012, at which point the government established the Coordination Council that consists of the six project leaders and public representatives of the local municipality, water board and provincial government. The subproject leaders understood the need for the Coordination Council, because of the wider public goals for nature restoration and improving the flood protection level. So, together the members of the Coordination Council redesigned the draft plan for the entire floodplain. Later in 2012, an agreement of intent was signed by the six project leaders to ensure a collaborative mind-set, ongoing commitment and a coordinated approach when implementing the integrated redevelopment plan which will be implemented between 2015 and 2018.

Supplementary to the integrated redevelopment plan, the subproject leaders established a maintenance vision for the entire project area with the aim of keeping the integrated perspective alive following the required land-use changes, i.e. implementation of the redevelopment plan. Normally, the project leaders would each have made their own maintenance vision for their own properties and would enter into a contract with individual nature managers or farmers. The maintenance vision included long-term strategies, preferred maintenance activities and monitoring efforts to enhance nature development and safeguard flood protection in an integrated way. Reasons for this new collaborative process included the lowering of maintenance costs that result from resource sharing, and the enhancement of recreational activities as a result of the removal of fences between properties. A stakeholder's evaluation of the collaborative process surrounding the realization of a shared maintenance vision for the entire *"Rijnwaardense Uiterwaarden"* is included in our study.

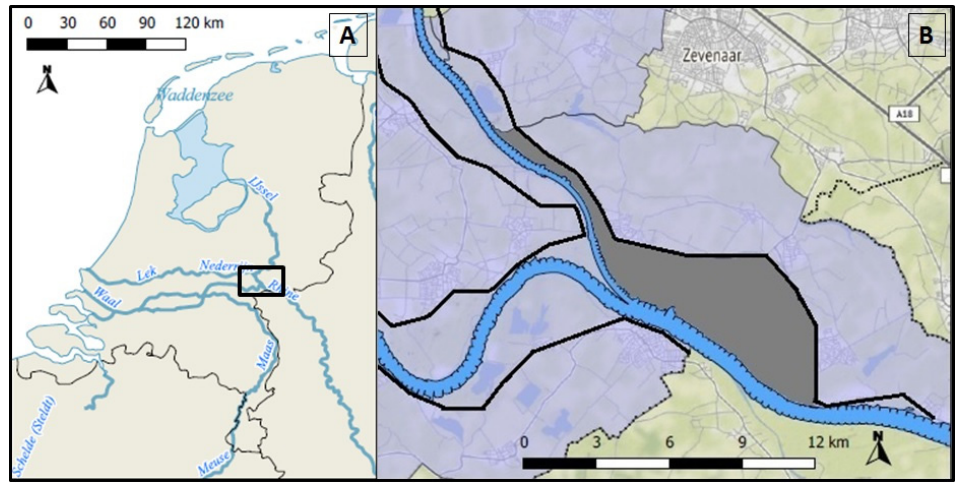

Figure 5.2 | (A) Location of the study area in the Netherlands and (B) the floodplain area of the Rijnwaardense Uiterwaarden (dark grey), including the location of levees (black lines), the border with Germany (dashed line) and the geographical scope of the Gelderse Poort (light grey).

5.3.2 Selection of respondents and data analysis

Our research design is based on a qualitative research method that includes interviews, combined with a short questionnaire, participant observations and document analysis. Face-to-face interviews were held using a semi-structured interview guide which provided the most data. Semi-structured interview guides were used to ensure that the same topics were addressed by all participants, while allowing individual experiences and perceptions to emerge (Patton, 1990). The semi-structured approach gives the interviewer an opportunity to probe for motivations and explanations, and creates space for innovative ideas or perceptions. In this way, both an integrated overview and detailed information can be obtained (Rubin and Rubin, 2005).

Respondents were asked to reflect on their incentives for joining the collaboration, the collaborative process, outcomes and lessons learned. Specific questions dealt with the respondent's roles and activities, inclusion of stakeholders, and what went right or wrong during the collaborative process. These evaluation categories were based on the collaborative governance framework (Figure 5.1). Respondents were also asked to reflect on the allocation of public and private responsibilities for common maintenance tasks and expected future changes concerning these tasks. In the United States, Parker et al. (2010) used a list of common tasks to define and understand the allocation of responsibilities between the coordinator and board members of watershed partnerships. In our study, a list of 18 maintenance tasks was extracted from Parker et al. (2010) and adapted to the issue of floodplain management. Respondents were asked to rate on a five-point Likert scale whether each task was predominantly a responsibility of government or private responsibility, for example with respect to tasks such as "monitoring of riparian nature objectives" or "developing a maintenance plan".

In total, twelve respondents were interviewed (Table 5.1): two private actors (resp. 1 and 3), four nature managers (resp. 4, 6, 8 and 13) and six public servants (reps. 2, 5, 7, 9, 10 and 11), including two mediators (resp. 2 and 10). Respondent 12 did not contribute to an interview, but answered some questions by e-mail, and rated the 18 floodplain management tasks. Interviews lasted from 50 to 80 minutes each. All interviews were recorded and transcribed to facilitate data analysis.

In addition to interviews regarding the collaborative processes, several participant observations were made between September 2012 and November 2013. The first author attended seven meetings over a one-year period, five meetings of the Coordination Council and two meetings of the Stewardship. Observations were recorded as minutes and focused on the content of discussions and interactions among participants. Secondary data were obtained from documents including meeting minutes, reports, and the project website.

Text from all data sources was analyzed based on Miles and Huberman's (1994) three-phase process: (1) data reduction, (2) data display, and (3) conclusion drawing. Once the data were reduced and organized into themes, the reduced data were labelled within these themes as positive or negative perspectives of the collaborative process. The third step featured the structuring phase and involved

the creation of many tables and profile memos with the aim of organizing the respondent's answers or opinions per theme and per respondent. Software for qualitative data analysis (Atlas.ti) was applied during the analyzing phase.

In the discussion section, we extract four different stakeholder perspectives on collaborative floodplain management and we relate findings from this study to previous research on collaborative governance and multi-stakeholder processes.

Table 5.1 | List of respondents involved in the Coordination Council and/or the Stewardship, as well as the name of the organization, responsibility, and type of actor: public or private actor (* Governmental organization that was disbanded in 2015 due to state budget cuts).

Resp. nr.	Organization	Responsibility or role in the collaborative process	Type of actor	Member of
1	Representative of sand and clay mining company (*Bijlandse Waard*)	Project leader, private land owner	Private actor	The Coordination Council
2	Government Service for Land and Water Management*	Mediator and facilitator of the collaborative processes	Public actor	The Coordination Council and the Stewardship
3	Representative of sand and clay mining company (*Lobberdense Waard*)	Project leader, private land owner	Private actor	The Coordination Council
4	Foundation *Streekbeheer Rijnstromen*	Farmer's associations with the goal of combining nature conservation and agricultural activities	Private actor	The Stewardship
5	Municipality of *Rijnwaarden*	Responsible for local spatial planning: regional development through balancing economy, nature, recreation and flood protection.	Public actor	The Coordination Council
6	Association *Streekbeheer Rijnstromen*	Farmer's associations with the goal of combining nature conservation and agricultural activities	Private actor	The Stewardship
7	Provincial government – responsible for earth removal policies	Representative of the provincial government and responsible for excavation permits (for the planning an implementation phase).	Public actor	The Coordination Council
8	Foundation FREE Nature	Regional nature conservation organization in favor of introducing large herbivores to the floodplains with the aim of managing vegetation through natural grazing.	Private actor	The Stewardship

Table 5.1 | continued

Resp. nr.	Organization	Responsibility or role in the collaborative process	Type of actor	Member of
9	Provincial government – responsible for nature policies	Commissioner for the establishment of the Stewardship and responsible authority for nature conservation goals, including the implementation of the European Natura2000 objectives on the provincial scale	Public actor	The Stewardship
10	Government Service for Land and Water Management*	Mediator and facilitator of both collaborative processes	Public actor	The Coordination Council and the Stewardship
11	Rijkswaterstaat (Directorate-General for Public Works and Water Management)	Executive agency of the Ministry of Infrastructure and the Environment, who manage all activities in the floodplains that influence water quality and quantity (flood protection) on a national scale.	Public actor	The Coordination Council
12	Representative of sand and clay mining company (*Bijlandse Waard*)	Project leader, private land owner	Private actor	The Coordination Council
13	State Forestry Service	Representative for implementing and monitoring nature conservation goals	Semi-public actor	The Stewardship

5.4 RESULTS

This section presents the stakeholder's frames with regard to their incentives, the collaborative process, intermediate outcomes, and lessons learned. Both stakeholders from the Coordination Council and the Stewardship collaborative platforms are represented. Subsequently, respondent's reflections on the distribution of tasks between governmental and private organizations, and expected governance changes in floodplain management are given.

5.4.1 Coordination Council: incentives and intermediate outcomes

This paragraph focuses on the collaborative process that occurred between project leaders in which they aimed to formulate a shared maintenance vision for the *Rijnwaardense Uiterwaarden,* a collaborative sub process of the Coordination Council. Respondents 1, 2, 3, 10 and a colleague of respondent 11 were closely involved in this sub process. The municipality and provincial government (resp. 5 and 7) did not take part in the formulation of the maintenance vision, they were only a member of the Coordination Council.

Incentives to join the discussion on floodplain management in the Coordination Council among private land owners (resp. 1, 3, and 12) included: having a history of past cooperation and wishing that to be continued in the future; wanting to tune their own maintenance plan and objectives to the geographical floodplain area; and being part of the *"Rijnwaardense Uiterwaarden"*. The incentives to join the collaborate process relate to issues such as historical relationships, alignment of objectives, and a moral imperative; "*there is no other way"*, based on the idea that they are the owners of land that is an intrinsic part of a greater area.

Governmental organizations framed incentives to join the collaborative process as *"we want to realize and maintain public goals* [i.e. flood protection and nature goals] *in the floodplain area"*. Additionally, they saw the process as contributing to an assignment given by the Minister of Economic Affairs to implement cost-efficient and effective floodplain management. Similarly to private land owners, governmental organizations wanted to align objectives, especially by tuning objectives between governmental organizations.

A reason for the mediators (resp. 2 and 10) to facilitate the collaborative process was that this case study reflected the maintenance problems and challenges facing the entire Dutch river system. The goal of the collaborative process was to formulate a shared maintenance vision for the entire *"Rijnwaardense Uiterwaarden"*, to have a shared point of departure for the permit process, and to set a long-term strategy. Because each project leader needs to request permits for their land to implement the jointly formulated redevelopment plan, adding a maintenance vision to the permit request will be seen as an asset by the responsible authorities.

Ultimately, participants formulated an integrated maintenance vision in the form of a report by taking flood protection objectives, the natural, dynamic riverine system, and recreational activities into account. This strategic document for the entire floodplain was, according to all participants, the most important intermediate outcome of the collaborative process.

5.4.2 Coordination Council: collaborative process

This paragraph describes the stakeholder's evaluation of the collaborative process up until the shared maintenance report was produced. In retrospect, the participants praised each other's commitment and openness when potential mutual gains were explored during the collaborative process. Respondents emphasized the issue of developing a better understanding. A mediator stated: "*there was a high degree of transparency and the participants were committed to the formulation of an integrated maintenance vision*". The participants appreciated a shared understanding: *"now we are familiar with each other and aware of each other's objectives and projects"*. The atmosphere was described as friendly and constructive. A private land owner described the collaboration as a self-evident or natural process.

Negative attitudes were expressed by five out of seven participants regarding the prolonged and laborious process. A private land owner stated that the process had lasted longer than expected. One

reason posed for this was the voluntary character of process, which increased the amount of time required before consensus was reached. A public servant stated: *"there was no overriding authority to fall back on, this would have accelerated the process* [of formulating an integrated vision]*"* (resp. 5).

In addition, a public servant suggested that private land owners focused primarily on the implementation of the redevelopment plans instead of discussing issues relating to the maintenance of the floodplain, which posed an obstacle to progress. A mediator described the private land owners as pragmatic people *"who live from day to day"*. This attitude complicated the discussion regarding long-term visions and the formulation of a shared maintenance vision according to the mediator. Two public servants suggested that the diverse roles of Rijkswaterstaat (the roles of water authority and particularly land owner) were not sufficiently represented in the process.

5.4.3 Coordination Council: lessons learned

Stakeholders formulated lessons learned based on their positive and negative interpretations of the starting conditions, process and intermediate outcomes. Two private land owners learned that you should keep the integrated approach in mind during the entire process, even after years of collaboration. A private land owner also stated that

"I think that it [the collaborative process] is mainly the work of people. If everybody envisions the same goal then almost anything is possible, that should be the driving force among the participants. […] It [the collaborative process] ultimately stands or falls with the willingness or unwillingness of the participants to co-operate."

This statement suggests that issues relating to the social aspects of collaboration are more important than the technical or financial issues.

The three public servants recapitulated lessons learned from the development of the maintenance vision with respect to collaborative advantages and inadequacy (incompleteness). One respondent expressed that it was useful to collaborate as opposed to working from *"our ivory towers"*. In contrast, a second respondent stated that the shared vision itself was not sufficiently defined. Additionally, the collaborative process suffered as a result of insufficient internal communication within Rijkswaterstaat. A representative of Rijkswaterstaat was involved in the process, but this individual did not represent all the different objectives and underlying visions of their organization (both responsible authority for flood protection and land owner).

Mediators learned that, in practice, nobody really feels responsible for the combined objective of widespread, dynamic riparian nature and integrated floodplain management. In addition, the mediators discovered that triggering collaboration through financial incentives does not work for all participants. Governmental organizations tried to convince the private land owners to create a long-term vision together, to ultimately pursue cost-efficient floodplain management. Governmental organizations often based their arguments on the idea of economies of scale. However, the private

land owners were more focused on integrating their maintenance vision with a multi-functional floodplain system, including possibilities for recreation.

5.4.4 The Stewardship: incentives and intermediate outcomes

After the formulation of the shared maintenance vision by public and private stakeholders in the Coordination Council, a second collaborative process was initiated on the action level. This second collaborative process was actualized by a platform called the Stewardship. The provincial government (resp. 9) formed the driving force behind the initial start-up of the Stewardship. The provincial government commissioned the same mediators (resp. 2 and 10) of the Coordination Council to search for collaborative arrangements between local nature managers (resp. 4, 6, 8, and 13) in an effort to operationalize the integrated maintenance vision of the Coordination Council. The collaborative process resulted in a shared action plan, which was presented to the members of the Coordination Council, but was finally rejected by Rijkswaterstaat.

In the context of decentralization, the provincial government stated that they are searching for opportunities to reduce maintenance costs because of declining state budgets allocated to the preservation and development of nature reserves. This incentivizes provincial government to stimulate the creation of nature managers partnerships (i.e. Stewardships) that are able to manage large floodplains more effectively and decrease its administrative burden. Another incentive of the provincial government was to increase political awareness of the potential relationship between maintaining nature and flood protection objectives (resp. 9).

The most important incentive for nature managers to join the collaborative process was: *"we already maintain a small piece of the floodplain area, but we would like to expand our maintenance activities"*. Maintenance activities could consist of mowing and pruning of vegetation, or introducing year round grazing by introducing 'wild' animals, such as Highland cattle to the floodplain area. One nature manager stated that their organization would like to be of value to other nature conservation organizations and build its reputation as a reliable nature manager with the provincial government, who initiated the collaborative process. The same nature manager stated that possible inconsistencies between their wilderness vision and others from neighbouring floodplains were an incentive not to join the collaborative process.

5.4.5 The Stewardship: collaborative process

This paragraph describes the stakeholder's reflection on the collaborative process between nature managers to write a shared action plan (resp. 4, 6, 8, and 13). The process began with some mistrust between stakeholders. All nature managers saw each other as competitors, because each of them suggested that they would be able to maintain the entire floodplain area on their own. Therefore, the first meeting initiated by the mediators was designed to build trust and develop a better understanding. All participants appreciated that the participants were able to easily identify short and long-term objectives for collaboration. In addition, the participants quickly and clearly identified roles for each participant in the process. All the nature managers were very positive

about the mutual collaboration and the open exchange of knowledge and information, despite the sometimes tough negotiations. An important intermediate outcome of the process was the mutual recognition of the requirement for combining agricultural activities with nature management. A nature manager positively framed the organization of informal meetings that occurred without mediator involvement, which improved relationships and trust. A second nature manager was enthusiastic about the increased solidarity that occurred during the process. According to the provincial government, the process went smoothly because of the strong motivation of nature managers, who were driven by money-making opportunities. Moreover, a mediator stated that the nature managers were committed to writing an action plan together instead of individually.

Additionally, the nature managers reflected on some negative experiences of the process. Firstly, it was difficult to estimate a budget for the proposal. Reasons for this problem included the use of different calculation methods among nature managers, and a lack of data concerning financial benefits and costs of maintenance, especially relating to large-scale grazing. A nature manager stated that the collaborative process was delayed because of a lack of clarity surrounding the state and provincial budgets for maintenance activities, including the availability of subsidies.

5.4.6 The Stewardship: lessons learned

The overall lesson learned by the nature managers is that the collaborative process increased the level of trust between them. A nature manager also learned that more stakeholders could contribute to a *"wilderness"* strategy. The wilderness strategy is a management paradigm which is based on the idea of restoring the dynamic, natural floodplain landscape through minimization of human interventions, i.e. a system of *"self-regulating nature"* (see for more information; Fliervoet et al., 2013). The aim of this approach is to improve the biodiversity and nature value of the floodplains. Another nature manager highlighted the need for an independent organization to facilitate collaborative processes, or more specifically to facilitate the negotiation process and to support the quest towards a shared action plan.

The mediators learned that maintenance costs will decrease dramatically when large floodplain areas instead of small individual properties are maintained. Another nature manager acknowledged an increased understanding of insights about grazing management on a large-scale, especially the introduction of wild or semi-domestic herbivores, such as European bison or wild horses (elements of the wilderness ecological reference). The introduction of natural grazing contributes to the restoration of natural dynamics in the floodplain area.

5.4.7 Evaluation of the interaction and overall lessons learned

The previous paragraphs describe the stakeholder's frames on the two separate collaborative processes undertaken by the Coordination Council and the Stewardship. However, there was also close interaction between the two platforms. Firstly, the maintenance vision of the Coordination Council was used as input for the activities of the Stewardship. Secondly, the management proposal formulated by the nature managers was delivered to the Coordination Council. However,

Rijkswaterstaat rejected this management proposal. The rejection was based on two fundamental arguments: (1) the proposal did not conform to the procurement rules of Rijkswaterstaat, and (2), as stated by the Rijkswaterstaat representative, *"We [Rijkswaterstaat] have within the last two years wanted to use maintenance activities in floodplain areas as a form of income generation"*. The former argument is related to a requirement to openly tender management activities rather than allocating them directly to specific nature organizations. The latter argument relates to the need to create additional income streams in response to recent financial cuts applied to the department of real estate within Rijkswaterstaat.

The rejection of the action plan by Rijkswaterstaat and their associated retreat with respect to the shared maintenance vision revealed the mismatch between the two collaborative organizational and action levels. Respondents-related problems such as the exclusion of stakeholders, the power of Rijkswaterstaat, poor communication, and the conflicting objectives of governmental organizations. All nature managers and the provincial government realized that they had not sufficiently encouraged the involvement of land owners and funding authorities, especially the department of real estate of Rijkswaterstaat, on the action level. According to a nature manager, the rejection of the management proposal reflects the difficult relationship with Rijkswaterstaat, *"which is often revealed at the end of the process"*. As a result of the process, all nature managers became very pessimistic about realizing collaborative arrangements with Rijkswaterstaat. The local nature managers feared that the tender process may exclude them because they expect that only large organizations are able to tender based on the large property of Rijkswaterstaat. Nature managers also highlighted the poor communication and coordination between governmental organizations. This is demonstrated by the initiation and facilitation of collaboration between nature managers by provincial government and the inability of Rijkswaterstaat to do direct business with a partnership of local nature managers.

A private land owner was surprised about the ease by which Rijkswaterstaat can pursue its own plan and strategy, despite a need for public accountability. According to a public servant, this pursuit of self-interest was already visible in the Coordination Council, where the maintenance vision seemed to be more a part of the mediator's rather than the private land owner's agenda. In addition, private land owners and public servants highlighted the differences between governmental organizations. This manifested in the different learning goals set by the provincial government and Rijkswaterstaat concerning collaborative processes on the action level. Finally, one public servant stated: *"we could have foreseen these results 5 or 10 years ago"*. This statement refers to the slow and prolonged process of floodplain management and the poor learning capacity of the authorities.

The mediators expressed learning goals that were related to the process context, namely *"the current conditions reinforce segregation instead of integration of maintenance activities"*. They stressed the conflicting policies of nature versus flood protection as a huge obstacle for the initiation of collaboration. They also emphasized the poor coordination that exists between governmental

organizations. Additionally, the mediators learned that the internal institutional goals of governmental organizations, specifically the economic perspective of Rijkswaterstaat, prevent collaboration. A mediator stated that *"we [the Netherlands] miss a catalyzing vision for integrated floodplain management"*. This statement refers to the lack of a reference or integrated vision for floodplain management on a policy level.

5.4.8 Stakeholder's assessment on the allocation of tasks

A list of 18 common maintenance tasks was used to explore the respondent's perspective on public and private obligations with respect to floodplain maintenance. As Table 5.2 shows the respondents considered that the majority of tasks are the responsibility of government or a shared responsibility. Tasks relating to flood protection, such as monitoring and developing flood protection objectives, are clearly considered to be governmental tasks, in contrast with nature tasks. Private organizations especially consider the monitoring of nature objectives as a shared responsibility. Tasks relating to the involvement of local society and the application of scientific knowledge in the field are also seen as a shared responsibility. According to the respondents, private responsibilities include tasks such as the implementation of maintenance measures (mowing, pruning, etc.), involving volunteers, and the establishment of Stewardships. Interestingly, results relating to the task of *"directing function in floodplain management"* are inconsistent. Representatives of the private organizations suggested that this is a governmental responsibility and vice versa.

Future collaboration

The previous paragraph described the stakeholder's assessment on the current tasks relating to floodplain management. Additionally, respondents were asked to reflect on their future responsibilities and tasks. The majority of respondents expected a shift towards more collaboration between public and private organizations (10 out of 12). Land owners envisioned an increase in private obligations with respect to the realization and maintenance of riparian nature and foresaw an increase in collaborative processes relating to monitoring activities. Additionally, land owners referred to the increased attention devoted to corporate social responsibility (CSR), which implies that private organizations are responsible for their regional and local surroundings. Private organizations are motivated by profit, but they are also aware of the importance of including local environmental and societal issues in their businesses plans.

The most important shift according to public servants is the commercialization of maintenance activities on properties owned by Rijkswaterstaat through tendering. With this in mind, a public servant expected greater collaboration between Rijkswaterstaat and other land owners and nature managers. However, according to the same public servant, in the last 5-10 years there has not been any progress towards this goal. Two public servants did not expect a significant shift towards collaboration and stated that the government should take on the role of strategic planner, and should encourage greater freedom for regional and local decision-making processes in floodplain management. A public servant stated that decisions are currently guided purely by flood protection

Table 5.2 | Stakeholder's (N=13) assessment of the allocation of maintenance tasks between governmental and private organizations. The first number indicates the total number of responses, the number between brackets indicates how many were from private respondents. One governmental respondent gave two responses for task 4, 16, 17 and 18.

Tasks	Governmental task	Predominantly government	Both	Predominantly private organizations	Private task	Don't know
1. Monitoring flood safety	10(5)	3(1)				
2. Monitoring nature objectives	3(1)	3(0)	6(5)	1(0)		
3. Involvement of local public		1(1)	9(3)	2(1)	1(1)	
4. Introduction of new maintenance measures		2(0)	7(4)	4(1)		1(1)
5. Involvement of volunteers			5(2)	5(2)	2(1)	1(1)
6. Developing flood safety objectives	12(6)	1(0)				
7. Developing nature objectives	7(2)	3(1)	3(3)			
8. Integrating financial resources	7(2)	3(1)	2(2)			1(1)
9. Aligning flood safety and nature objectives	5(2)	4(0)	4(4)			
10. Implementation of maintenance measures			3(2)	6(3)	4(1)	
11. Facilitation of meetings between governments, land owners and nature managers	2(0)	4(2)	6(3)			1(1)
12. Setting the agenda for floodplain management along the Waal River	3(0)	2(1)	6(4)	1(0)		1(1)
13. Apply scientific knowledge in the field		2(1)	8(3)	2(1)		1(1)
14. Authorization of measures	11(5)		1(1)		1(0)	
15. Establishment of watershed partnerships (i.e. Stewardships)			4(2)	5(2)	2(1)	2(1)
16. Directing function in floodplain management	2(1)	4(1)	3(2)	3(0)	1(1)	1(1)
17. Developing guidelines and rules	2(2)	6(2)	3(1)	2(0)		1(1)
18. Developing a maintenance plan for a floodplain	1(1)	4(1)	4(2)	4(1)		1(1)

objectives (flood protection-centric), and that no integrated (multi-centric) vision is applied to maintain floodplains.

A nature manager added that the responsibility for tasks concerning "*developing guidelines and rules*" and "*developing a maintenance plan for a floodplain*" will shift to private organizations. In addition, local nature managers desire more responsibility in maintaining floodplains in order to become more creative and to make better use of local knowledge. However, they envision obstacles in the form of the tender process and the strict and detailed nature objectives. It was thought that the tender process would attract large nature conservation organizations and that local organizations will be outcompeted from participation. The latter tension expresses the conflict between the detailed nature objectives formulated by the provincial government, and the more "dynamic riparian nature" vision of some nature managers.

5.5 DISCUSSION

The results describe the stakeholder's reflections on their incentives, the collaborative process, outcomes, responsibilities and lessons learned in the context of collaborative floodplain management. Collaboration was fostered by building new partnerships on an organizational and action level, which is important for capacity building (Imperial, 2005). Moreover, the respondents referred to an increased content knowledge and a better understanding of each other's objectives through the collaborative process. Intermediate outcomes were identified on both levels, especially the development of an integrated maintenance vision and an action plan. Despite the open and transparent collaborative processes, the goal of solving the fragmented and conflicted nature of maintenance activities was never fulfilled. To better define the challenges of sustaining a collaborative governance approach to maintain multi-functional floodplains, the discussion is divided into sections relating to multi-actor, multi-scale and multi-sector challenges (similar to Dewulf et al., 2015).

5.5.1 Multi-actor challenges; underlying perspectives, roles and responsibilities of public and private organizations

Respondents framed a number of different incentives that encouraged participation in the collaborative platforms; however, two shared incentives were found: (1) recognition among participants of their interdependence, and (2) the incentive to align the organization's goals and objectives to other stakeholders. In literature, the later incentive is one of the most important motives for participation in watershed partnerships (Leach et al., 2002). Moreover, these incentives provide a shared set of stakeholder goals and produce a sense of togetherness. However, analysis of the allocation of tasks with regard to public and private responsibilities in floodplain management revealed an imbalanced image. The majority of management tasks are considered to be the responsibility of the public organizations, especially the maintenance tasks with regard to flood protection. This reflects the long history of dominance and trust that people have in Rijkswaterstaat. Verbrugge et al. (2017) showed

that Dutch society does not feel responsible for flood protection, or feel the need to participate in decisions relating to it. Crabbé et al. (2015) compared policy frames and flood management practices in the Netherlands and Belgium and showed how a specific framing of flood risk management leads to a specific allocation of responsibilities which in turn may reinforce the existing management frame. Because of such path-dependencies, the allocation of responsibilities between public and private parties cannot be changed easily in flood management (Crabbé et al., 2015).

The dual role of Rijkswaterstaat as responsible water authority and land owner created a complex and ambiguous collaborative process. During the process the collaborative aims and role of Rijkswaterstaat were unclear to the majority of the respondents. In addition, the multiple roles and size of the organization resulted in the appearance of different representatives of Rijkswaterstaat at different times, which slowed the process and reduced the adherent to previous agreements. During the later stages of the collaborative process, Rijkswaterstaat reframed their role from that of water authority to that of land owner who wishes to use their land as a source of income. This is quite a logical choice from the perspective of Rijkswaterstaat which has faced severe budgetary cuts applied by central government. In conclusion, the following underlying perspectives were derived from the collaborative floodplain management case study. These perspectives should be addressed in practice to enable integrated floodplain management:

- Supplementary to their role as responsible authority for flood protection, Rijkswaterstaat pursues a market-orientated approach or economic perspective with respect to the maintenance of floodplains. This perspective is reflected in the use of tenders, commercialization of maintenance activities, and its focus on cost-efficient floodplain management.
- The provincial government (authority for nature goals) applies a collaborative perspective as a governance strategy with the aim of decreasing its own administrative burden in relation to nature subsidies. Additionally, the collaborative perspective helps to promote issues of maintaining nature and flood protection goals in the political arena.
- Private land owners hold a locally based perspective which is actualized by giving attention to corporate social responsibility (CSR) through the application of local community values (e.g. recreational values) that ensures a continuation of business opportunities.
- Nature managers pursue more self-determination in the maintenance of floodplains in order to implement nature conservation activities that include collaboration with local communities and volunteers and enhance the dynamic riverine ecosystem while taking agricultural activities into account.

In this case study, Rijkswaterstaat used its regulatory powers to implement its own policy and reach its own objectives, which frustrated collaboration. Rijkswaterstaat pursued a policy of income generation from their properties by calling for tenders instead of undertaking maintenance activities with a partnership of local nature managers (especially in the form of hiring properties to individual farmers or large nature conservation organizations). The local nature managers feared that they would be outcompeted, because they expected that the tender process would only attract

large nature conservation organizations. Moreover, private land owners wanted to include the local community and local nature managers in collaboration to ensure the continuity of their businesses. The market-approach adopted by Rijkswaterstaat and the fear of exclusion of local nature managers are factors that can lead to a crowding-out the intrinsic motivation to act co-operatively (Vollan, 2008). The crowding-out effect seems to create a new dilemma for the authorities because in this case they have to choose between the commercialization of maintenance activities (making a profit), and cooperation with local and regional stakeholders. The most challenging aspect is the need to reconcile these different underlying perspectives before realizing integrated and collaborative floodplain management.

5.5.2 Multi-scale challenges; different levels of collaboration

Governance of floodplain management is addressed on multiple scales and levels. This chapter analyzed collaborative processes on two separate levels; an organizational level and action level. At the organizational level, public and private participants aligned their objectives based on a type of coordination strategy. This strategy is defined as "*an interaction between participants in which formal linkages are mobilized because some assistance from others is needed to achieve organizational goals*" (McNamara, 2012, p. 391). At the action level, the private participants seemed to pursue a collaboration strategy. McNamara (2012, p. 391) defines a collaboration strategy as *"an interaction between participants who work together to pursue complex goals (integrated floodplain management) based on shared interests and a collective responsibility for interconnected tasks which cannot be accomplished individually*". Our results are similar to the study of Robinson et al. (2011) who showed that action-level groups often discuss specific projects and activities, while organizational-level groups work to align organizational programmes and priorities. But the stakeholders appeared not to define a strategy aimed at connecting the two levels of collaboration. This lack of interaction is partly to blame for the implementation gap.

Additionally, public organizations need to take into account objectives and issues relating to administrative scales (EU, national, provincial and municipal) in collaborative processes (i.e. Van Lieshout et al., 2011). Our results show a clear mismatch between national goals and regional goals within Rijkswaterstaat. On a national level, the main aim of Rijkswaterstaat is the realization and maintenance of flood protection, preferably in association with regional or local platforms that reduces the amount of contracts and landscape fragmentation resulting from multiple ownership. However, the regional department of real estate of Rijkswaterstaat displayed a profit motive with regard to maintenance activities. This economic perspective prevented collaboration on an action level and indicated that conflicting interests resulted from different internal institutional goals of Rijkswaterstaat. These conflicting interests demonstrate a mismatch between different administrative scales.

In conclusion, the issue of collaborative maintenance cuts across the jurisdictions of national, regional and local public organizations, however, there is no integrated vision for floodplain management (multi-centric) to connect and attune different policy levels. The lack of an integrated vision is

reflected in the stakeholder's argument that nobody feels responsible for integrated floodplain management and the complaint that an overriding authority is missing. Moreover, when attempting to establish responsibility for the task of *"directing function in floodplain management"* (Table 5.2), representatives of private organizations suggest that government should take responsibility while the representatives of governmental organizations suggest that private organizations should be responsible.

5.5.3 Multi-sector challenges; issues of integrating flood protection and nature objectives

Conflicts of interest are not only found within an organization, but also between the water sector (focus on flood protection) and nature sector (focus on nature conservation). Flood protection and nature policies are closely connected, but at the same time the responsible governmental institutions and processes are fragmented and not capable of developing and realizing integration (Fliervoet et al., 2016). This explains why respondents frame the very poor coordination between both sectors as an important problem that prevents integration of maintenance activities on a floodplain scale. Moreover, public organizations use different financial systems to support maintenance activities. Land owners have an obligation to maintain flood protection levels according to water policy and at the same time they are eligible for receiving subsidies for nature conservation. Furthermore, the majority of nature reserves in the floodplains are protected under the European Natura2000 legislation. Nature managers aim to enhance nature development, while water managers intend to minimize vegetation development in floodplain areas to maintain flood protection making it difficult to align both sets of goals in the same geographical area. In other words, the current regulations choke collaborative processes (c.f. the treat of regulations: e.g. Bentrup, 2001). This dilemma impacts land owners most severely because they need to foster both goals on their properties.

The contradiction between nature and flood management goals highlights the need for an integrated (multi-centric) vision on a policy level, which addresses the lack of synergy between flood protection objectives and nature objectives with clear guidelines and ground rules. Moreover, on an organizational level, a close collaboration between the provincial government (responsible authority for nature goals) and Rijkswaterstaat (responsible authority for flood protection) would enhance integrative and collaborative governance on an action level.

5.6 CONCLUSION AND IMPLICATIONS

In this section conclusions are drawn by answering the research questions and implications for collaborative arrangements in maintaining multi-functional floodplains are given. The stakeholders' reflections on the collaborative case study show that formulating integrated maintenance plans for floodplains with involvement of multiple stakeholders is certainly possible, but implementing them causes multi-actor challenges, such as the conflicting underlying perspectives. Tension results from the economic perspective of Rijkswaterstaat, which could not be aligned with a locally based

collaborative approach to resolve fragmented maintenance activities in the floodplains. This tension may eventually reduce the intrinsic motivation to act cooperatively (i.e. crowding-out effect), despite of the participants' recognition of their interdependence and the need to align their organizations' objectives with other stakeholders.

The most important obstacles observed by the participants are the lack of an overarching integrated maintenance vision for the Dutch floodplains and the lack of coordination between the (water and nature) authorities. These multi-scale and multi-sector issues resulted in the decoupling of the collaborative processes between the organizational and action levels. Moreover, these issues illustrate the inflexibility of the existing institutional setting of Dutch river management, which is also fuelled by the conflicting policies between the water and nature sectors. This problem of nested hierarchy of multiple public organizations that hinders new collaborative arrangements is also found in America and Australia (Ananda and Proctor, 2013; Wyborn and Bixler, 2013).

The participants' defined the majority of the maintenance tasks as governmental responsibilities, which underlines the dominant and hierarchical role of public organizations and the lack of shared responsibility.

To achieve integrative and collaborative governance in the future, the challenges inferred from our results need to be addressed: reframing the underlying perspectives, enhancing flexibility of public organizations and increasing shared responsibility. These challenges demand a more collaborative-learning approach, including social learning processes to tackle value differences, flexible budgets, and more attention to local perspectives. Water policies should include more locally based knowledge and perspectives to transfer more responsibilities to local and private stakeholders (Bergsma, 2016). Additionally, more research is needed on the roles and relationships of the public organizations operating at different collaborative levels in the maintenance of floodplains.

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Doorgaande route

CHAPTER 6

Towards a Joint Maintenance Approach for floodplain management in The Netherlands: tensions and possibilities

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ABSTRACT

While multi-functional river rehabilitation has taken the limelight in today's water management, its follow-up phase, maintenance, much less so. A key challenge for today´s environmental management is the number and diversity of actors and sectors involved, each with their own perceptions, interests and resources. The present contribution seeks to apply the gains made in the Joint Planning Approach, developed earlier at Radboud University, Netherlands, to the maintenance stage of river planning. The application of that approach in the densely populated Netherlands is contrasted with an example of top-down, mono-functional maintenance in a floodplain area in the Southwest. It is found that the approach brings considerable opportunities to integrate a fragmented field but that considerable challenges remain related to fragmented policies, building collaborative entities, organizational constraints.

6.1 INTRODUCTION

In 1995 the mid-Netherlands experienced flooding on the river Rhine. Over 200,000 people were pre-emptively evacuated in the Southeast Netherlands and bordering areas in Germany. Next to an urgent dike repair programme, the Netherlands decided to make horizontal space for rivers post-flood rather than constrain them more - a rather radical change of direction in a densely populated country. This engendered an extensive planning and implementation programme for Dutch waters: *Making Space for the River* (2015) (Rijke et al., 2012; Warner et al., 2012). Now that the implementation of the programme of work is about to be finalized, a new phase is called for, the floodplain maintenance phase. This phase is to be embedded in the recently formulated long-term objectives stated in the Dutch Delta programme, a middle- and long-run strategy (2050-2100) to keep the Netherlands flood- and drought-free in the face of extreme climate-change scenarios.

Actors in Dutch land-use policy know they will continuously encounter each other in different policy domains and in different "games". This means they will have to invest in good working relations in addition to substantive negotiation and strategy (Warner et al., 2010). Since the 1970s, a range of stakeholders have demanded and obtained a place at the negotiation table in river planning and implementation. Rivers became valued for more than just their production and drain function, giving rise to multi-functional river widening and deepening projects, while managers now ventured "behind the dikes" to integrate land and water management (Immink, 2006). River managers learned not to fear or ignore citizens, and new forms of participatory planning developed, such as Radboud University's Joint Planning Approach, banking on the strong bonds many people feel with the river (De Groot and Warner, 2011).

While that brought some encouraging results for river interventions, how does this work during the post-implementation stage, and what should be done if this stage produces unforeseen problems? Maintenance of floodplains is a slow and politically unexciting process: it rarely brings photo opportunities, and long-term visioning exceeds customary political horizons. Moreover, maintenance activities in Holland are fragmented as the actor configuration has been changing.

The key problems concerning collaborative governance related to the maintenance of multi-functional floodplains concern:

1. absence of a shared vision on how to maintain multi-functional floodplains in the Netherlands (Fliervoet et al., 2013); and
2. the near-absence of collaborative relationships between water agencies and nature conservation organizations (Fliervoet et al., 2016).

We shall illustrate our points with the help of three Dutch case studies, contrasting "joint" and "non-joint" maintenance and completed and non-completed projects:

- Saeftinghe (non-joint, managed by just one nature management organization; completed)
- *Munnikenland* (joint collaboration regarding the maintenance; completed)
- *Rijnwaardense Uiterwaarden* (joint collaboration regarding the maintenance; not completed)

The cases comprise recent multi-purpose river rehabilitation programmes in the flood-prone Netherlands. The actors mainly comprise institutional stakeholders, although local actors did not necessarily stay away. Interviews, participant observations, video recordings and reports, including governmental as well non-governmental documents, were used to explore the case studies. Based on these case studies we set out to answer the following research questions:

- Which lessons could be learned from past multi-purpose river rehabilitation programmes to facilitate ongoing and future collaboration concerning the maintenance of multi-functional floodplains?
- (How) can joint planning as a working methodology strengthen collaborative processes in maintaining multi-functional floodplains? (Joint Maintenance Approach)

Briefly, we explore if the working methodology of JPA could be introduced in collaborative processes to strengthen partnerships between diverse actors and sectors in the currently fragmented maintenance of multi-functional floodplains.

6.2 BACKGROUND: PARTICIPATION DESPITE CONFLICT

Involving multiple stakeholders provides a kind of safety net by tapping the coping capacity of a wider range of actors in tackling highly complex issues. Integrated or Adaptive Water Management is beset by uncertainties, which make planning less than linear. In this context, Faysse (2006) notes that public-sector actors tend to have a double rationale for encouraging public involvement: (1) local stakeholders are more knowledgeable about the details of a policy issue, so that tapping their knowledge can improve the quality of the project; (2) multi-stakeholder involvement fosters a support base, which makes it easier for authorities to implement projects, reducing the likelihood of costly public protest and litigation. While this perspective focuses on how an issue can best be "sold" and governed, policy-affected stakeholders may be more concerned with reducing policy uncertainty, and increasing the chances of a positive benefit in their everyday lives (or resisting negative impact).

Given the contextual developments in Dutch river planning towards integration and adaptivity in the past few decades, top-down planning will not suffice for many water management problems, which present themselves as "political" or "wicked", beset by uncertainties, unexpected dynamics and complexities (Kooiman, 1993; from climate change and systemic risk to political oscillations) and disparities over the values of land, water and nature. This has given rise to a deliberative turn in planning (Healey, 1997; Innes and Booher, 2003). At the turn of the century, multi-stakeholder

participation and planning reached their heyday, especially in the Netherlands.

As a result, however, Dutch policy-making is slow to get started and hard to stop or change course once given the go-ahead. Short of emergency legislation, any policy plan has to clear many participatory and legislative obstacles to reach the finishing line. This sluggish pace is annoying and potentially costly to all involved, and many would like to find ways to accelerate the planning processes. An obvious candidate would be more straightforward and efficient planning, which suggests more power-driven forms of management. We will first examine an example of a top-down Dutch riparian maintenance arrangement that is *neither* multi-stakeholder nor mono-functional: self-management in the *Sunken Land of Saeftinghe*.

6.2.1 Saeftinghe

In Europe, land owners are supposed to keep a watercourse associated with the land up to a minimum standard, and more recently have incentives to enhance its environmental quality. In Holland, non-public stakeholders, especially agricultural and nature organizations, are quite well represented in river management. They have the right to "self-realize" publicly agreed interventions with a view to enhance safety from flooding. In the Netherlands, maintenance activities with regard to flood protection and nature restoration are likewise mostly fragmented, performed on a small scale (land owner scale) and based on single-sectoral perspectives. A wide range of governmental organizations are involved, which indicates the dependency of non-governmental organizations (NGOs), and integrated maintenance objectives are still missing.

An example is the Sunken Land of Saeftinghe, located in the tidal area of the Scheldt estuary, in the Dutch province of Zeeland, right next to Belgium (Figure 6.1). A protected area under the Ramsar Treaty in 1995, and Natura2000 in 2009 as one of the very few European deltas that has a full gradient from salt- to freshwater, and it functions as an important hibernation area for birds. Historically, the reclaimed area's main economic activities have been agriculture and peat extraction, run by private landlords. Saeftinghe was supposed to buffer the city of Antwerpen from flooding from the Western Scheldt (Nienhuis, 2008), but it flooded repeatedly and after the particularly destructive All Saints' flood in 1570 the owners decided not to recover it. Human settlement ended in 1584 when the dikes were cut for strategic reasons: to avoid the cities of Gent, Bruges and Antwerp being occupied by Spanish troops (De Kraker, 1997).

Keeping the area flooded, created space for both excess water and for sediment to accrete; a historic example of a "natural" solution to accommodate flood risk. Due to continued diking, canalization and constant dredging to facilitate deepening the fairway to Antwerp international port means river sediment has no natural accretion space and salt marshes are eroding.

While 2,500 out of the total 3,500 ha area are state-owned, the whole territory is run by an environmental management non-profit NGO, Het Zeeuwse Landschap (HZL) (Jacobusse and Decleer, 2003). The area, with a view on the reactors at Doel, across the border in Belgium, has

a small marina, but conserving the environment is the key concern. HZL works with social partnerships, such as recipients of psychiatric care, to maintain the area[7]. Dutch and Flemish environmental organizations in the HZL headquarters signed the "Saeftinge Treaty" for the joint rehabilitation of the transboundary area. Other local actors however have accused HZL of acting as a commercially-minded landlord making deals with local business. In 1995 the landlord of the only local café managed to obtain a monopoly on such services and international business (Dow Chemical, based in nearby Terneuzen). This does not sit well with local farmers and citizens.[8]

As the main attraction of the sparsely inhabited region, ecological tourism has economic importance; HZL promotes ecological tourism, presenting an adventurous group trek through the area at ebb tide. Individuals are banned from the grounds, for their own safety and so as not to disturb plants and animals. Locals from nearby Emmadorp opposed the establishment of a visitor center, and the fact they lost their right to roam in the natural area (Speelmansgat and De Uitslopen) and need to apply and pay for an entry pass with HZL.

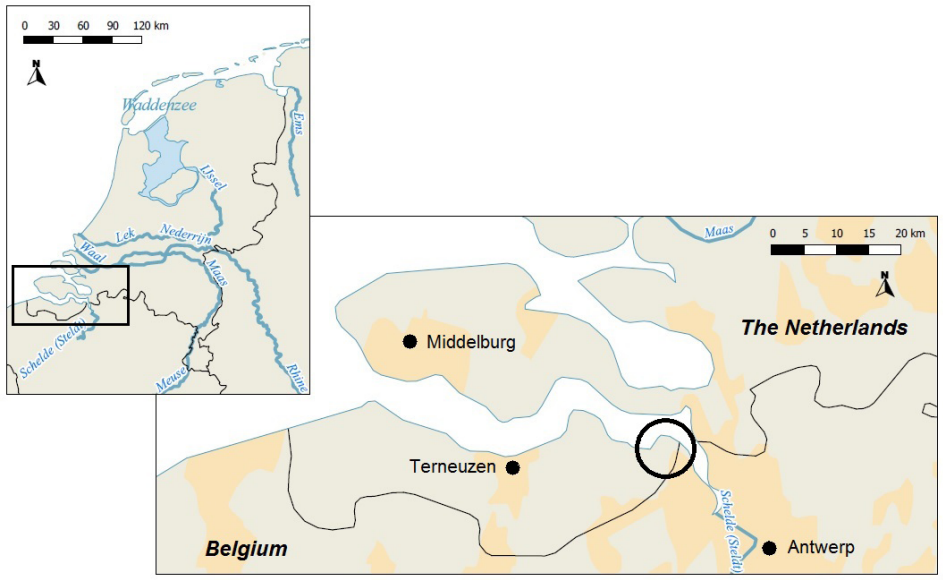

Figure 6.1 | The location of the Sunken Land of Saeftinghe (black circle) near the city of Antwerp in Belgium

7 Source: http://www.omroepzeeland.nl/nieuws/2013-11-05/561353/verdronken-land-saeftinghe-opgeknapt#.VcdHEGwVgdU.

8 Source: http://www.volkskrant.nl/archief/van-emmahaven-mogen-de-recreanten-wegblijven~a413393/, De Volkskrant daily, 3-3 1993.

A local stakeholder survey (Muhlig, 2011) suggests that local stakeholders do not appreciate their "backyard" being run in a top-down, technocratic way by an organization that is not local. Conflicts basically remain unmanaged. However, the small scale and low stakes prevent escalation and promote indifference.

In a larger watercourse, however, used by various stakeholders, this self-management is not so straightforward and governments at various levels tend to engage. Where national levels have given space, lower-level authorities have enthusiastically stepped in. Unlike the national level, these authorities tend to be open to collaborative efforts in land-use planning. This has created opportunities for "joint maintenance" of floodplains in multi-functional settings in the central Netherlands. Below, we look at two examples of attempts to realize this, mindful of the above considerations.

6.3 INTRODUCING THE JOINT PLANNING APPROACH

In the context of the transregional *Freude am Fluss* project, funded under the Interreg IIIb facility, a Joint Planning Approach (JPA) was developed by Nijmegen University's Centre for the Sustainable Management of Resources (CSMR). The European-funded project developed an approach to truly involve key stakeholders in river management in all planning stages: joint fact-finding, joint design, joint institutions, joint options, joint decision making and joint implementation. The underlying philosophy was that by facing flood risk and people's varying interests in tackling this head-on, participatory arrangements would be possible that provided something for everyone.

Freude am Fluss explored innovative approaches to river management in France, Germany and the Netherlands that do not see flood risk and public engagement as a problem, but as a potential source of enjoyment (*Freude*, in German). In the Netherlands this triggered the creation of *WaalWeelde*. Loosely based on the JPA approach, this integrated multi-actor programme aimed to develop a more natural river landscape enhancing economic performance at a higher level of protection. The programme connected public, private and societal organizations in the planning and implementation phase of multi-functional river management along the intensely navigated River Waal (Smits, 2009).

The JPA is an adaptive planning approach deviating from the top-down model practiced before the 1990s. Prior to this time, rivers were managed based on nationally developed blueprints which needed to be followed to the letter (Table 6.1). Adaptive management in dynamic environments seeks to learn and adjust, "building the plane while flying it", rather than try to control the system at issue. We found much of the current "Habermasian" participatory planning literature unrealistic, however. Starting from the community level, it assumes an underlying consensus that can be reached by deliberation (the argumentative turn) involving stakeholders at certain junctures to arrive at something that looks like a consensus – and by doing so this overcomes conflict. While attractive in theory, the deliberative

turn is marred by social, practical institutional realities. We therefore contrast our approach with a deliberative design, as a more "realistic", mixed-mode model (Table 6.1).

Land-use planning, we find, involves both learning and fighting (Warner and Van Buuren, 2009); it is never entirely win-win. Land-use planning in a densely populated area with contrasting interests is very likely to lead to conflicts, all of which may not be bridgeable. Local interests may be fundamentally at odds with policy-makers' convenience, as well as with each other's (say, farmers vs. environmentalists). This means that reaching consensus is bound to be troublesome. If things go smoothly, a lot of "social learning" and integrative negotiation will take place; if they don't, there will be "distributive" phases in which each one fights for their piece of the cake.

People who will be expected to sell or lose their homes or lands may never really forgive planners for their loss. However, it is often possible to arrive at a truce, a *modus operandi*, an agreement to disagree, in which all agree that the procedure is fair even if they may not agree with the distributive outcome.

Despite these conflicting interests, therefore, it still makes sense to engage stakeholders in dialogue throughout the policy process. At worst, they will appreciate being heard and taken seriously, at best, they will feel "ownership" of the proposed policy. If this leads to conflict, this is not always bad.

Table 6.1 | Comparative summary of approaches adopted from Verhallen and Warner (2007). This table compares the traditional blueprint approach to land-use planning, the currently popular deliberative ("Habermasian-Rousseauian") approach, and our proposals for a more "realist" compromise between the two.

Blueprint approach	Process (JPA) approach	Deliberative approach
Based on authority	Basic sense of trust and sense of interdependence	Shared problem
"Powering"	A mix of "powering" and "puzzling"	"Puzzling": power and politics are the problem
Rigid budget and time constraint	Flexible budget and time within limits	Flexible budget and time
Regulated by administrative contract	Regulated by voluntary agreement; adaptable agreement	Regulated by voluntary agreement; adaptable agreement
Output-oriented	Debate-oriented	Consensus-oriented
Rigid Budget	Flexible budget	Flexible budget
Clear problem and goals, technical planning to tackle facts	Fuzzier problem and goals, social learning, agreement to disagree	Consensual goals, social leaning to tackle (factual and) value differences

Surprisingly in light of the Dutch reputation for deliberative, inclusive planning, the Dutch system turns out not to be very participatory at all from a grassroots perspective. Participation on policies and projects is usually the business of paid-up employees of NGOs and lobbyists (Wolsink, 2006). Public authorities tend to be unpleasantly surprised by local platforms (Community-Based Organizations)

springing up and demanding a say, while they had spent most of their energies getting a range of formal stakeholders in line. These platforms have turned out to be savvy networkers in media, political, academic and bureaucratic circles and developed successful PR strategies.

A lack of timely communication, consultation and adaptivity, on the part of both governments and local stakeholders have played an important part in conflicts over multi-functional river restoration projects (Warner, 2011). We also need to be mindful of the "shadow of the past" as potential conflict shaper and intensifier (Sebastian, 2009): if relations were seriously damaged before, even long ago, its overhang will deeply affect any future planning. For example, in the East Netherlands, conflict over the handling Foot and Mouth disease in rural areas between public authorities and farmers at the turn of the millennium affected the legitimacy of interventions to Room for the River planned later. It is also not unusual for stakeholders at the implementation stage to keep coming back to discuss/question the principles of the plan while the project team wants to "get on with it" (Warner, 2011).

Dissent, however, is not fatal to effective land-use planning. Conflict reveals the real state of play better than harmony, and as John Forester (2007) has noted, "conflict is better than apathy". Outright conflict may mean the temporary breakdown of communications between parties who see non-negotiation as their BATNA (Best Alternative to a Negotiated Agreement), but if there is a sufficient degree of interdependence between stakeholders, no one will pull out indefinitely (Verhallen et al., 2007; Warner, 2009).

As for deliberative planning, literature and practice show that stakeholders do appreciate participation, but do not want to be consulted and made responsible for everything all of the time. The top rung on Arnstein's Ladder of Participation (1969), autonomy, is not necessarily considered an ideal end-point of participatory planning. Participation involves transaction and opportunity costs, bringing barriers to nonprofessional participants (Uphoff et al., 2002). As a fishing-sector stakeholder said in a hearing on the conflictive Jubilee River bypass project on the Thames: "You are the authorities, tell us what you have in mind and we'll give you our opinion" (cited in Warner, 2011). Deliberative democracy only proves popular in limited doses. People do not want to deliberate about everything and anything: when issues are straightforward, they are likely to refer to the "experts" and get on with their lives.

The modality of participation in this context is also important. Public participation was frequently translated into the devolution of responsibility to local actors and state retrenchment; the Netherlands is no exception. However, we find that despite a professed hands-off approach, the public sector in continental Europe is not quite prepared to let go, it hangs on to crucial aspects. As a result, multi-stakeholder platforms as a rule are not where decisions are made (Warner, 2007). Participatory processes are usually limited to one particular point in time: hearings after plans have already been developed, designed and costed. Then, after a smaller or greater degree of citizen consultation the

project is implemented without further feedback. As a result, stakeholders may feel the participatory process is instrumentalized to further the interests of other actors (Dewan et al., 2014).

Finally, while potentially promoting social learning and dispute resolution and the generation of innovative ideas, a deliberative multi-stakeholder approach risks becoming a talking shop if it is not informed by expertise and linked to the formal decision-making process for resolving/managing intractable conflicts (Hisschemoller and Hoppe 1998; Verhallen et al., 2007; Van Buuren et al., 2014). People may need some training to know what they are talking about in complex environments. Real-time scenarios and games may facilitate visualization of different alternatives.

Informed by Dutch, French, German experiences with joint planning gained in *Freude am Fluss*, the JPA team concluded therefore that conflict, some top-down steering and technocratic facilitation is considered inevitable. They propose that the customary deployment of technical expertise (puzzling about facts) needs to be complemented by deliberation over its underlying values and a strong anchoring (powering; Heclo, 1974; Vink et al., 2014) in "justifiable technocracy, desired collaboration and unavoidable conflict".

This leads us to three complementary elements of "joint planning" (De Groot and Warner, 2011):

- Unavoidable top-down planning and technocracy.
- Collaborative puzzling element.
- Conflict management element.

We shall illustrate these elements in the context of maintaining the floodplains in the Dutch Rhine Delta.

6.4 CASE STUDIES

6.4.1 History and reconfiguration of actors

The case studies *Munnikenland* and *Rijnwaarden* are projects within the *WaalWeelde* program launched in 2006, in which "Making Room for the River" and "Joint Planning" were central concepts. However, *Rijnwaarden* covered a longer history of public-private collaboration. The planning process of this project started in 1996 with a new dynamic discourse emphasizing restoring riparian nature in the area (Table 6.2). Flood safety goals were added to the planning process later due to the near-floods of 1993 and 1995. In contrast, *Munnikenlan*d had an integrated plan to improve flood protection from the outset while restoring dynamic natural processes and safeguarding cultural interests.

In both cases the previous agricultural function of the floodplains was transformed towards a combination of flood protection, nature and cultural functions – for instance constructing new side

channels through the floodplain to increase the discharge capacity of the river and offering more space for natural values. In *Munnikenland,* the Waal river was given even more space through dike relocation. The regional Water Board and the Directorate for Public Works and Water Management (Rijkswaterstaat) coordinated the planning and implementation process at Munnikenland with a primary focus on flood safety objectives. The *Rijnwaarden* case was coordinated by the Government Service for Land and Water Management, a neutral governmental organization focused on coordinating land and water management. Additionally, many other governmental and non-governmental organizations were involved due to the JPA. Stakeholders were identified based on their position, their role in decision process and their reputation, which resulted in the "4-B" concept: Directors (*Bestuurders*), Public officers (*Beambten*), Businesses (*Bedrijven*) and Citizens (*Burgers*) were all at the table. Directors represented the provincial government, Rijkswaterstaat, Water Management Board, municipalities and State Forestry Service. Additionally, knowledge institutes, businesses such as sand, clay and gravel mining industries, nature organizations, consultancy firms, and representatives of civil platforms were part of the collaborative process in *WaalWeelde*. The express involvement of these groups was an advance over the ongoing Room for the River program, where local interests at times felt sidelined. In particular, the activism of a local platform (Hoogwaterplatform) from 2002, successfully enlisting the other three "Bs" in the Ooijpolder, an area slated for controlled flooding, had led to the shelving of said plan (Roth et al., 2006). In other Room for the River projects, local activism led to considerable delays or modification of the intervention. It was realized that the early involvement of these groups could pre-empt later frustration, while planners could benefit from the knowledge and insights of these stakeholders, rather than fearing their power of obstruction.

Table 6.2 | Characteristics of the "WaalWeelde" case studies *Munnikenland* and *Rijnwaarden*.

	Munnikenland	**Rijnwaarden**
Context of case study	*Munnikenland* was one of 39 projects in "Room for the River" program	Autonomous development, but included in the "Room for the river" program
Start of planning	From 2006	From 1996; 1999: first draft of redevelopment plan, including a maintenance vision
Aim of project	To reduce the peak water levels (during high water) by 11 centimeters, in combination with nature restoration and the strengthening of cultural and historical values in the floodplain	To reduce the water levels (during high water) by 11 centimeters, while developing 500 hectares of new riparian nature, making the area accessible for recreation and allowing sand and clay mining
Measures	Dike relocation and lowering the floodplain (including construction of side channels)	Lowering the floodplain (including construction of side channels)
Total area size	700 hectares	590 hectares of land and 425 hectares of water

As Room for the River terminated in 2015, river management in the Netherlands is shifting towards maintaining multi-functional floodplains. This implies a new focus for the current collaborative

processes between public and private stakeholders and brings new collaborative challenges. Moreover, the shift implies a change in the geographical interests by adding a more local scale to the established multi-stakeholder groups. Additional interests in the maintenance of floodplains include local nature conservation organizations, agricultural nature stewardship associations and land owners. Especially in *Munnikenland* the municipal authority pushed to have maintenance activities incorporated for the local farmers, united in the agricultural nature stewardship association, *De Capreton*. This new configuration of actors will have to deal with challenges, such as a lack of long-term vision, fragmented maintenance policies, dispersal of land property rights and failure to catch the attention of directors. This makes the maintenance of multi-functional floodplains a complex issue. Table 6.2 provides some ´fast facts´ about the two case studies, *Munnikenland* and *Rijnwaarden*. The next paragraph will discuss how the JPA elements can be traced in these projects.

6.4.2 Top-down vs. bottom-up (powering)

The multi-functionality of floodplains leads to complex interdependence of stakeholders with respect to the different functions, especially concerning flood protection and nature restoration (Fliervoet et al., 2013; Schindler et al., 2013). A regional two-day conference in 2011 highlighted the perception of overdue maintenance, held by the Directorate for Public Works and Water Management (Rijkswaterstaat), of floodplains in the Dutch Rhine Delta. The success of river restoration programs created an enormous increase of riverside softwood forests, which tend to reduce the river's peak discharge capacity. However, agreed flood protection levels were not achieved, inciting Rijkswaterstaat to respond with a *top-down* maintenance program called Streamline. The program reduced flood risk to a single, conceivable and manageable physical problem, solvable by removing vegetation in the floodplains according to a baseline situation in 1997 (Van Soest, 2008). This top-down approach strongly contradicted the previously adopted multi-level and multi-stakeholder approach. Since the 1990s, public and private stakeholders had developed and implemented integrated plans to improve flood protection while restoring dynamic natural processes and safeguarding agriculture and recreational interests (Room for the River). A top-down approach would likely undo the spectacular increase in biodiversity achieved along the Dutch rivers and new economic perspectives related to eco-tourism that also resulted from this transformation to more natural and multi-functional floodplains.

Finally, Rijkswaterstaat agreed to abandon "resetting" the floodplains to the baseline situation of 1997. Like many Dutch planning policies and rules, the baseline reference was very static in relation to a dynamic, more natural floodplain environment. Rijkswaterstaat imposed upon land owners to maintain the floodplains as a steady-state area, as opposed to the provincial governments, which subsidize land owners to restore and develop new natural values in the floodplain. They adopted their approach by only removing vegetation in the so-called "streamlines" of the floodplains: areas in the floodplain that will flood first during high peak discharges. However, this did not resolve the conflict on maintenance of flood protection and natural values in a harmonized way.

6.4.3 Conflict management

The Streamline approach accelerated the discussion on how to maintain the new constructed multi-functional floodplains. As a result, not only physical problems (increase of vegetation) but also conflicting policy goals and collaborative challenges became clear (Fliervoet et al., 2013). As a water manager[9] explained: *"I have to request eight permits to remove one tree in the floodplain"*. Moreover, water and nature policy are planned in isolation and implemented by two different authorities. The Ministry of Infrastructure and Environment is responsible for water and flood management policies, while the nature management policies are implemented by the provincial governments. The provincial governments plan and implement European Union Natura2000 objectives based on the European legislation, and allocate subsides for nature conservation. Natura2000 is a network of protected natural areas in the European Union, encompassing the European Habitats Directive and the Birds Directive. This legislation demands for nature conservation and development of the European nature areas. The majority of natural values in the Dutch floodplains comes under Natura2000, which implies compensation and mitigation efforts for every change in these floodplains, such as removing soft-wood forests to reach the flood safety levels. This might lead to frustrated water managers, as one Rijkswaterstaat officer stated: *"compensation and mitigation: these concepts do not match our philosophy and cost too much money"*.

For Rijkswaterstaat, the maintenance activities and decisions are hard to uphold, because of the huge number of land owners involved: 37,000 hectares out of the total 70,000 are owned by 15,000 private land owners (Van Soest, 2008; interview June 2011). Therefore, collaboration between land owners, nature organizations and water agencies are stimulated.

The *Munnikenland* case (Figure 6.2) illustrates such a collaborative effort, whereby local farmers are involved in nature management in the floodplains together with the State Forestry Service and the Water Board (Luijt et al., 2012). *Munnikenland* is a floodplain along the Waal river and is situated in the middle of the Netherlands and part of the municipality of *Zaltbommel* (Figure 6.2). This floodplain area forms part of the Room for the River program of work. The challenge was to reduce the peak flood level by 11 centimeters, in combination with nature restoration and the strengthening of cultural and historical values in the floodplain. These values included the castle of *Loevestein* and the New Dutch Waterline (in Dutch: *De Nieuwe Hollandse Waterlinie*), a former military line of defense based on controlled river inundation. After the planning process the local authority of *Zaltbommel* insisted on a vision of maintenance including "agrarian stewardship": environmentally-minded farmers getting together to find ways of combining agricultural activities with nature conservation goals. This resulted in a partnership between the State Forestry Service, agricultural nature stewardship association *De Capreton*, a farmers' union and the regional Water Management Board. However, this collaboration was fraught, due to the wide variety in underlying landscape visions. After all, in addition to their different maintenance visions, it is important to understand the stakeholders' characteristics and motivating factors in order to reach joint action for

9 interviewed at Rijkswaterstaat, December 2011.

floodplain management (Rosenberg and Margerum, 2008). In this case, for example, the agricultural stewardship associations, had a "cultural landscape" vision as opposed to the natural dynamics or "wilderness" river vision that the State Forestry Service cherished.

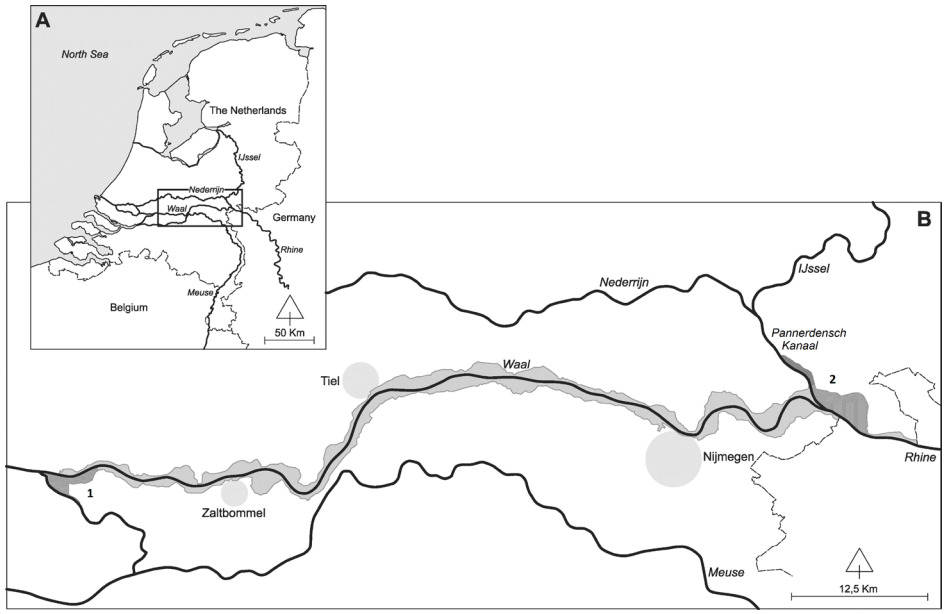

Figure 6.2 | The location of the case studies along the Waal and Rhine rivers. *Munnikenland* (1) and *Rijnwaardense Uiterwaarden* (2) (dark grey). The floodplains along the Waal river are indicated in light grey, as well as some large cities (light grey circles).

6.4.4 Collaborative element (puzzling)

To solve these conflicts and tensions stakeholders emphasized the importance of collaborative approaches to maintain the floodplains sustainably, despite the dominant role played by the Dutch governmental organizations (Fliervoet et al., 2016). Functionalist reasons given in favor of collaboration include the limited public resources available: government simply does not have all the information, power and funds necessary for environmental management, which makes the public sector dependent on other stakeholders (Gray, 1989; Huxham and Vangen, 2005). Budget cuts have only increased this dependence over the past few years. Moreover, involving diverse stakeholders can increase public support, reduce opposition and improve the implementation of government policy. Finally, there is a moral argument to say that involving stakeholders democratizes environmental management (Mostert et al., 2007).

We noted the fragmentation of Dutch maintenance activities above. However, collaborative initiatives regarding the maintenance of floodplains are observed at the policy, practitioner and scientific level. The actors' recognition that floodplain management has become a complex, dynamic

and fragmented issue and the call for collaborative approaches resulted in the establishment of a temporary task force on floodplain management in 2011. The Task Force was tasked to find an integrated, multi-stakeholder approach to maintain the newly constructed multi-functional river landscapes. Late in 2013, the Task Force developed a joint governance structure, but without shared, formulated, collaborative objectives: only fuzzy objectives – such as efficiency – were identified, instead of a way to reconcile flood protection and nature goals. The envisioned governance structure consisted of a "*Waal Board*" , in which different public organizations had to cooperate, and new private-private partnerships between land owners and nature conservation organizations, called "*Waardschappen*" (Stewardship councils). This governance structure at a previously unknown scale, the floodplain, first conceived of by a coalition of ministerial officers and environmentalists (De Bruin et al., 1987) but so far underdeveloped (Vreugdenhil et al., 2008), keeps alive the egalitarian ideal that everyone can contribute. But while the construction of a "*Waal Board*" and "*Waardschappen*" provides a platform for all stakeholders, it makes a clear distinction of responsibilities between public and private organizations, in contrast to the JPA of the *WaalWeelde* program, in which a range of actors were involved in the redesign of floodplains based on a bottom-up approach and in public-private partnership.

By contrast, at the local, practitioner level a second case, *Rijnwaardense Uiterwaarden* (also shown in Figure 6.2) showed the opportunities for two partnerships between a group of land owners (initiators) and a group of nature conservation organizations. The group of land owners consisted of public and private organizations. The *Rijnwaardense Uiterwaarden* is a large floodplain area along the Rhine river located in the east of the Netherlands (Figure 6.2). The area is a strategic location regarding flood protection and nature objectives, because it is where the Rhine river divides into the Waal river and the Pannerdensch canal and its location in the middle of a designated Natura2000 area. The area has experienced a long history of designing redevelopment plans. The first redevelopment plan dates back to 1999. Finally, in 2012 the land owners committed themselves to develop an integrated design for the whole area by signing a collaborative agreement. In April 2013, this resulted in the development of a joint vision of maintenance (Willems, 2013). Soon the vision attracted the attention of three different organizations involved in nature management. With public sector support, the nature organizations decided to jointly construct a maintenance plan for the whole area instead of responding individually to the maintenance demand from land owners. Through highlighting their complementarity, dealing with expert knowledge, working with wild grazers and their experience with involving local volunteers and farmers, a collaboration was established between the State Forestry Service, an agricultural association for nature management and an organization for nature conservation called *FREE Nature*. Its director stated: "*the collaboration with the State Forestry Service and agricultural nature association was inspiring, but it was hard to reach agreement*".

At the time of writing the collaborative process had stopped due to the disintegration of the land owner group: "*The implementers (nature managers) are willing and able to collaborate, however the land owners and financiers are not free and fast to make choices for procedural reasons" (ibid.)*. While changing policies are indeed part of the issue, the diversity of land-owning interests is undeniable.

The maintenance of floodplains also attracted academic attention, especially from a management perspective. The collaborative element is observed in the funding of a national, interdisciplinary research program, *"RiverCare: towards self-sustaining rivers"*. In this program, a considerable number of Dutch universities and research institutes cooperate to improve predictive models and enhance river maintenance, meanwhile reducing river management costs by studying the interaction of hydraulic, morphological and ecological processes as well as governance issues. The researchers plan to monitor the effects of the Room for the River measures to enhance safety and reduce maintenance from a "*growing awareness that dynamic natural riverine processes should be better utilized (and restored) in order to comply with the multi-functional objectives of rivers*" (Augustijn et al., 2014).

6.5 DISCUSSION: TENSIONS AND OPPORTUNITIES

The above has sketched three examples of environmentally-driven floodplain management: one unashamedly top-down and mono-functional, and two multi-stakeholder and multi-functional. The Saeftinghe case indicates that mono-sectorial top-down area management can work at a smaller scale. This relates to the issue Huxham and Vangen raise (2005, p13) advising practitioners and policy makers: *"don't collaborate unless you have to"*. But the case also showed up ongoing tensions with other stakeholders and does not do the trick where multiple interests and functions are at play. Therefore, management of a multi-functional area clearly requires a different approach.

We suggest that joint planning as a working methodology could be introduced in the current collaborative processes to maintain multi-functional floodplains - in other words to apply a Joint Maintenance Approach (JMA) – because the two multi-stakeholder cases indicated the tension between a desire for multi-stakeholder participation and the reality of a fragmented and neglected maintenance process after the implementation of river widening program. This tension is analyzed by the top-down, conflict and collaborative elements of the process, resulting in challenges of collaboration for environmental case studies.

Despite integrated and collaborative approaches in the planning phase, organizations relapsed into top-down and single-objective strategies in the maintenance phase, especially when a shared vision for the maintenance of the floodplains is lacking. These single-objective measures show the difficulty of sustaining integrative and collaborative perspectives. However, top-down vs. bottom-up approaches are not the key determinant for the success of collaborative management (Koontz and Newig, 2014), as it shifts to a new phase. In Ohio, resources, willing land owners and networks were key factors promoting the implementation of successful collaborative watershed management. In our case, the conflicting, single-objective strategies brought the problem of joint floodplain maintenance back on the agendas of the directors.

Exploring the conflict element showed both the horizontal and vertical fragmentation of communities and governance institutions, but also the fragmented policy and political setting,

which creates conflicts. For example, the Dutch flood safety and nature policies are very static in relation to a dynamic, more natural floodplain environment. These narrow single policies and responsibilities makes it difficult to activate the right actors at the right moment and is a challenge for collaboration (Agranoff, 2007; Margerum, 2011). According to Rigg and O'Mahony (2013), it is hard to integrate at lower levels if there is no policy integration at higher levels, as illustrated by the conflicts in the case of *Munnikenland*. This case also showed the challenges of collaboration on the local scale - stakeholders frame the maintenance of floodplains to their own organizational interests (landscape vision). This challenge refers to the problem of path dependency (Watson, 2015), but also shows the importance of understanding each other's underlying frames and trying to reframe the problem towards a shared frame (Dewulf, 2011). Therefore, frames, motivations, time, and unfamiliarity are all significant factors that raise conflicts in collaborative processes (i.e Rosenberg and Margerum 2008).

The collaborative element showed the presence of willingness to invest in new collaborative initiatives on diverse scales to maintain the floodplains in an integrated way, while absence of willingness often prevents collaboration (Agranoff, 2007). At the national scale a multidisciplinary research program was built to integrate disciplines, such as hydrology, morphology, ecology and social science, to sustainably maintaining rivers and their floodplains[10].

At the regional level we found the institutional challenge of constructing an entity to maintain the integrated perspective, illustrated by the discussion on membership structures in the Task Force. The creation of "stewardship councils" (Van Buuren et al., 2013) engaged all stakeholders, but needed to be better embedded in the preferences of local actors and contextual realities. Their set-up has promoted an ill-advised strict separation between public and private responsibilities, encumbering rather than promoting public-private collaboration regarding the maintenance of the floodplains. Public-sector retrenchment is not matched by a hands-off approach in practice. At the local level the debate for new collaborative initiatives has started between land owners and nature managers (*Rijnwaarden*). However, the constraints of the funding procedures, slow process, and the power differences between the land owners prevented the implementation of shared maintenance activities (see also Lubell (2004) and Rigg and O'Mahony (2013) on such policy constraints and frustrations).

6.5.1 Further implications

How can we sustain collaborative initiatives, deal with previous relationships and improve the attractiveness of collaborative process? Generating energy and enthusiasm can help accelerate a collaborative process. "Serious games" visualizing alternatives are one way of doing this: if people can picture why something could or should be done, they are more likely to engage. For example,

10 Likewise, in Australia five principles were defined to make interdisciplinary collaboration in research a success: forge a shared mission; develop "T-shaped" researchers, i.e. with both sufficient breadth and depth; nurture constructive dialogue; give institutional support; and bridge research, policy and practice (Brown et al., 2015).

the floodplain management game by Stefanska et al. (2011), in which water managers and farmers interacted to manage a floodplain, proved a useful tool for stakeholders to experience the challenges of policy- making for river management regarding agricultural use of the floodplains. Furthermore, the decision-making process of the stakeholder could be analyzed with the help of the same game. A pitfall here is decision-makers being tempted to delegate the tortuous process of convincing stakeholders to visual artists, whose rendering/artists' impression of a development project may have strong power of persuasion, but also inevitably papers over very relevant negatives of the project (Hajer et al., 2006). A game or scenario session presenting and thinking through the consequences of alternatives may well provide a more "objective" and informative setting for deliberation over a planned intervention.

A viable complement could be participatory monitoring to provide a common information base: without good-quality information, dialogue is uninformed and participants have no basis to challenge factually incorrect or biased positions and dispel myths on causes, scale and severity of problems. Reliable information and training helps non-experts to build capacity and confidence so they can engage effectively in dialogue. This should include dealing with unwelcome information (corruption, political interference and linkages) and participatory monitoring in controversial policy issues: a "safe space" for frank dispute without press interference (Cundill and Fabricius, 2009).

6.6 CONCLUSION

It is tempting to neglect the maintenance stage in any policy cycle. The present contribution has sought to remedy this lacuna, while recognizing the complexity of river management. The Dutch planning scene is fragmented, and densely populated by interested parties who are bound to encounter each other on various land-use issues. Where management is simple, a simple structure may suffice, although the case of Saeftinghe suggests this can still bring unease. Where the policy system is complex, Ashby's (1958) Law of Requisite Variety suggests a governance system that echoes this complexity. Based on our Dutch riverine cases, we see joint maintenance as a promising avenue for participatory river management. It can help develop a comprehensive perspective for floodplain management. Exploring the top-down, conflict and collaborative elements in the collaborative process of maintaining floodplains illustrated the increased complexity, which could not be addressed by a single organization or disciple. Therefore, we suggest applying a JMA to maintain multi-functional floodplains. This shift towards JMA creates collaborative challenges on the themes of fragmented policy and political setting; institution innovation by building collaborative capacity; and participant factors, like organizational constraints and connecting fragmented frames. As maintenance in itself is not very "sexy", serious games may help sustain enthusiasm and keep collaborative processes going. Stakeholders could start with setting up joint monitoring activities

(participatory monitoring) to build trust and to find new collaborative relationships, before radical changing the institutional settings.

The "puzzling" process facilitated by deliberative, participatory approaches to land-use planning may well need some "powering" to bring results and continuity. Thus, bottom-up processes may still need to be complemented by top-down and technocratic elements to keep things moving.

In sum, "joint maintenance" is an underexplored approach to multi-functional river management. There is still a lot to be learned before a Joint Maintenance Approach can really come into fruition. It may not be a bad idea to turn to experiences in non-water sectors – such as software development – for inspiration, where the need for maintenance-in-use as complementary to design-in-use is not unheard of (Marcolin et al., 2012). But the two "*Waalweelde*" cases are a promising experiment.

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CHAPTER 7

Synthesis

7.1 SYNTHESIS

Studies show that the technical aspects of integrated river basin management (side channels, multi-functional levees etc.) are better developed than the social processes that are needed to sustain collaboration (e.g. Ferreyra and Beard, 2007; Carr, 2015). Therefore, this research focused on identifying barriers hindering governmental and non-governmental organization's collaboration during floodplain maintenance in a flood prone, densely populated river delta (The Netherlands). Floodplain management has become rather complex because land use has moved from predominantly agricultural usage towards a complex mosaic of agriculture, nature inclusive agriculture, self-regulating nature projects, eco-tourism and even flood adaptive housing. In particular, the unbridled vegetation development linked to these developments causes increased flood risks. Removing the vegetation alone is not an option because this will frustrate national and European policy goals, such as Natura2000 and the Water Framework Directive. Although all involved organizations recognize the complexity of the problem and have strived towards a unifying maintenance concept and collaborative approaches since the last near-flood in 1995, they have not been successful in achieving a satisfying solution.

By making use of case studies, I revealed several barriers that hinder a joint and successful floodplain management strategy, i.e., collaborative governance. The preceding chapters reveal how stakeholders frame problems and give meaning to issues experienced during conflicts that arise because of, for example, fragmented maintenance activities or conflicting policies. Moreover, this thesis analyzed stakeholder's frames with regard to floodplain management issues (Chapter 2 and 3), relationships (Chapter 4) and the collaborative process (Chapter 5). The analysis of the stakeholder's frames has highlighted barriers that hinder the sustainability of collaborative initiatives in floodplain management. This shows that understanding stakeholder's frames is important for improving collaborative processes, which is in line with the findings of, for example, Dewulf et al. (2011) who also use the theory of framing.

Below, I describe the main barriers to collaboration that emerged from this research. Furthermore, I recommend to adapt a *Joint Maintenance Approach* (Chapter 6) to enhance opportunities for collaborative governance. This is followed by several recommendations that aim to help involved organizations identify measures to improve collaborative processes in floodplain management.

7.2 MAIN BARRIERS TO COLLABORATIVE GOVERNANCE

7.2.1 The lack of shared responsibility

At present, Rijkswaterstaat (the national water authority) has the responsibility to ensure that the floodplains of Dutch rivers can convey sufficient water during high water levels. To do so, Rijkswaterstaat has developed a floodplain management program named "Streamline" (Van Soest, 2008). However, various organizations and citizens question the way in which this management

program is applied. The complexity of maintaining sufficient water discharge capacity on the one hand while maintaining landscape and biodiversity values on the other is the main driver for the national water authority to create a shared feeling of responsibility amongst societal interest groups, and regional and local authorities, such as the Provinces and municipalities. This research demonstrates that a lack of shared responsibility hinders collaborative governance.

This lack of shared responsibility is, for example, reflected in the governance structure constructed by the Task Force floodplain management. After two years of discussions, the members of the Task Force envisioned a shared governance structure based on a public-public collaboration structure ("Waal Board") and a private-private collaboration structure ("Stewardships"). Despite this shared governance structure, participants made a clear distinction between public and private responsibilities by defining two separate collaborations within the governance structure. I argue that this shared governance structure reflects separation and emphasizes power differences, instead of moving towards shared responsibility and collaborative governance (Chapter 3). The idea of collaborative governance "is to shift 'ownership' of decision-making from authorities to stakeholders acting collectively" (Ansell and Gash, 2008, p. 559). However, Dutch authorities are not quite prepared to let go, hanging on to crucial elements. For example, governmental organizations still control and occupy central positions in the collaborative networks (Chapter 4). Moreover, it seems that the decisions are not made through multi-stakeholder collaborations (Warner, 2007). This is in line with several previous European, American and Australian studies which showed that government-based decision making had not yet shifted towards collaborative governance (Benson et al., 2013; Watson, 2015).

Public and private stakeholders framed the majority of maintenance tasks as the responsibility of governmental organizations. Stakeholders frame flood protection objectives particularly as governmental responsibilities (Chapter 5), which underlines the lack of shared responsibility. Additionally, Verbrugge et al. (2017) showed that Dutch civil society does not feel responsible for flood protection, or feel the need to participate in decisions relating to it. In contrast to flood protection goals, public and private stakeholders frame nature conservation goals as a shared responsibility (Chapter 5). As a result, the collaborative network with respect to nature conservation issues reflects a dense network with many cross-sectoral relationships (Chapter 4).

Finally, this thesis indicates that stakeholders are not expressing different or conflicting frames about their degree of ownership over the collaborative process (as discussed by Warner, 1997), but instead feel a lack of responsibility towards sustaining collaborative and integrated approaches within the scope of river basin management. There are many different authorities and organizations with overlapping responsibilities in the maintenance of floodplains. Despite this, it is suggested that the application of collaborative approaches provides opportunities for the reduction of waste, duplication, conflict and to share data and expertise (Gray, 1989; Wondolleck and Yaffee, 2000; Michaels, 2001; Margerum and Whitall, 2004).

7.2.2 The lack of shared visions

Besides the absence of a shared feeling of responsibility, a shared vision is also lacking, making synergistic actions impossible. During a collaborative process, stakeholders must develop a shared vision of what they can collectively achieve together (Wondolleck and Yaffee, 2000). In literature, this shared vision is also described as shared understanding (Ansell and Gash, 2008), finding common ground (Gray, 1989), "common aims" (Huxham, 2003) or "clear goals" (Glasbergen and Driessen, 2005).

Today's floodplain management is characterized by singular objectives and interests, such as flood protection or the restoration of riparian biodiversity (Chapter 2), and a wide range of collaborative objectives applied by stakeholders (Chapter 3). These singular objectives can even lead to conflicting situations, as was expressed by a representative of the national water authority; *"the Natura2000 policy goals are our biggest obstruction* [to implementing the Streamline program]*"*. Chapter 3 showed that stakeholders discuss collaborative goals, but framed them in terms of efficiency and coordination of activities between institutions. The focus on these shallow, superficial, and not substantive collaborative objectives - of course nobody will be against more efficiency - prevented a discussion on how to reconcile fundamental and conflicting objectives, such as flood protection versus restoring nature. Moreover, the expectation is that a discussion on more fundamental objectives will return when collaborative initiatives are implemented (Gray, 2004; Margerum, 2007). This again shows the use of fragmented issue frames by stakeholders which forms a barrier to collaborative governance and, in particular, establishing a shared understanding.

The *"static"* flood protection and nature conservation policies reflect these one-dimensional visions. These policies still frame "floodplain management" as being one of maintaining stability, harmony, and balance instead of dynamic, non-linear, and complex (full of surprise) (Grumbine, 1997; Ladle and Gillson, 2009). Policies that do not address multi-functionality and flexibility prevent the implementation of new nature based management strategies, such as Cyclic Floodplain Rejuvenation, that reconcile flood protection goals with nature restoration goals.

Governmental organizations obstruct collaborative initiatives through conflicting collaborative strategies, i.e., process frames. The national water authority aimed to create a market approach which contrasted with the provincial government, who focused on building collaborative platforms made up of local actors (Chapter 5). At first sight, these different strategies do not seem to conflict, but the market approach attracts large nature conservation organizations or individual farmers. This means that local organizations do not become involved. Secondly, allowing individual farmers to exploit floodplains maintains the fragmentation of maintenance and land use. Besides these different collaborative strategies, the authorities also seem not to take into account locally based frames or interests. Governmental organizations focus mainly on fulfilling flood safety or nature objectives by setting rigid targets on a small scale. Subsequently, local stakeholders pursue more self-determination - flexibility in time and space - and involve more local communities and volunteers

in efforts to realize more corporate social responsibility, which is not possible when rigorous regulations that dictate actions are enforced (Chapter 5).

Overall this thesis showed that stakeholders framed maintenance objectives along the lines of their own organizational goals instead of using references based on integrated goals or a shared vision. Additionally, participants expressed that they missed an overarching integrated maintenance vision for Dutch floodplains that provides clear guidelines and rules. A shared framework or maintenance vision that includes the diversity of frames on all levels to create a starting point for reframing and shared understanding will support the collaborative process.

7.2.3 The lack of sharing efforts and benefits

Challenges with respect to collaborative governance are not only resolved by sharing responsibilities or a shared understanding. In the ideal collaboration process, costs but also benefits are shared by the partners. One reason for establishing collaboration among governmental organizations is a need to accommodate declining state budgets for maintenance activities. Involvement of volunteers in floodplain management could lower the costs considerably. Additionally, small and fragmented properties could be maintained collectively to reduce and share costs. However, almost no practical research exploring the development of case studies that collectively maintain multi-functional floodplains exists. Fragmented relationships between water managers and nature managers hinder the sharing of costs and benefits (i.e., low operational capacity). The abolishment of the most central actor (Government Service for Land and Water Management), that took a coordinating role, enhanced this fragmentation (Chapter 4). The remaining authorities have not assumed this coordinating role, as shown by the results of the collaborative case study *Rijnwaarden* (Chapter 5). This lack of coordination contributes to the implementation gap between the organizational and collaborative action levels (Chapter 5).

Another important barrier that prevents the sharing of costs and benefits is the lack of an ongoing entity or network (collaborative agency: Sabatier et al., 2005). An ongoing entity or network of stakeholders with a collaborative mindset that operates from a shared vision towards floodplain maintenance. This thesis shows that the establishment of a public-private partnership is still constrained by negative perceptions, such as the fear that an additional level of administration will be created, and that too many organizations would become involved (Chapter 2 and 3). Future collaborative floodplain management requires the establishment of an organization or entity, such as the envisioned *"Waal Board"* structure (Chapter 3), with the capacity to increase coordination and ongoing operations between the water sector and nature sector.

7.3 RECOMMENDATIONS

In recent years, collaboration has undoubtedly grown within the planning and implementation phases, however its depth, extent and continuity in the maintenance phase remains highly fragile.

This is reflected in the discussed barriers to collaborative governance in maintaining multi-functional floodplains. Collaborative governance is hindered by a lack of shared responsibility, the absence of an integrated maintenance vision and a low operational capacity resulting from fragmented relationships. Moreover, this research demonstrates that there is a gap between the desired ideas of collaboration (collaborative governance), and the actual experience and practice of collaboration. Five recommendations to enhance and support future collaborative governance in maintaining multi-functional floodplains were formulated. These are based on the barriers to collaborative governance and opportunities discussed in chapters 2 to 6.

7.3.1 Adopt a Joint Maintenance Approach

The existing, collaborative approaches need to be redefined to foster collaboration and integration of interests in the maintenance phase. Floodplain management requires a collaborative approach that addresses issues relating to top-down decisions, unavoidable conflicts (conflicting frames) and desired collaborations. Therefore, I recommend that a *Joint Maintenance Approach* (JMA) is adopted as described in chapter 6. This framework, based on the joint planning approach, seeks to reflect a sense of realism rooted in practical experiences and accommodates elements of deliberative processes, learning and fighting (Warner and Van Buuren, 2009), and a balance between top-down and bottom-up decision making. Floodplain management should be based on a mix of top-down decision making (levels of flood protection) and freedom for bottom-up and locally based approaches. This philosophy is in line with studies that emphasize the importance of applying more participatory and collaborative approaches in river basin management (Challies et al., 2016; Pahl-wostl, 2015; Carr, 2015; Emerson et al., 2011).

JMA recognizes the diversity of stakeholder's frames and the often vague and complex problem definition. The natural, dynamic floodplain system should be complemented by key elements to improve multi-stakeholder collaboration such as flexibility, adaptability and learning. This means that a rigid, top-down blueprint approach is not desirable. Therefore, JMA enables learning through deliberately organized arrangements in which multiple stakeholders interact in order to understand each other's perspectives and interests about the reality outside. In addition, JMA promotes flexible budgets and time limits to maximize the chance that concrete decisions and actions will occur. Deliberative processes only proves popular in limited doses. Stakeholders do not want to deliberate about everything and anything: when issues are straightforward they are likely to defer to the "experts" and get on with their lives.

7.3.2 Make use of interactive tools and participatory processes

To facilitate and support a joint maintenance approach, the use of interactive tools and processes are recommended. These tools can help accelerate collaborative processes by generating energy and enthusiasm and give insights into the practitioner's decisions and frames. Studies promote a diverse number of interventions and interactive tools that may be used, such as interactive workshops, training, facilitation, serious games, collaborative modelling and ICT-enabled citizen observatories (Dewulf et al., 2007; Evers et al., 2016; Wehn et al., 2015). In the case of maintaining floodplains, these

interactive interventions and tools should address issues around feelings of shared responsibility and enhance new collaborative relationships through processes of understanding each other's frames and strategies (learning) and constructing shared frames for the future (reframing).

The fast developing world of ICT, serious gaming and Virtual Reality (VR) offers unique opportunities to design new interactive tools to support and accelerate the transformation towards more collaborative governance in river basin management. Stakeholders may need some training to better understand complex environments. Scenarios and games may facilitate the visualization of different alternatives. For example, the floodplain management game presented by Stefanska et al. (2011), in which water managers and farmers interact to manage a floodplain, proved a useful tool for stakeholders to experience the challenges of policy-making in river management with respect to agriculture in floodplains. Douven et al. (2014) showed how a gaming approach improved transboundary cooperation in the Mekong river basin by strengthening the understanding of issues and upstream-downstream impacts, and enhancing skills that facilitate transboundary cooperation. The game setting provided a "safe" place to experience river basin issues and showed the diversity of interests, frames and strategies used by stakeholders. Games should be used to facilitate discussion on issues encountered in reality, while avoiding real life sensitivities. Moreover, training programs on complex and interdependent topics, such as river basin management, should use games as a medium to promote shared understanding and, ultimately, collaboration.

Besides involving more local-based frames and values in the collaborative process, another way of enhancing shared responsibility and building relationships is to actively involve local stakeholders in monitoring processes. The collective monitoring of floodplains by experts and local stakeholders (e.g., volunteers, citizens etc.) can promote a better understanding of each other's frames and concerns, and enhance the creation of trusting relationships. The process of active involvement by local stakeholders in the systematic collection of information is called participatory monitoring (Fernandez-Gimenez et al., 2008; Villasenor et al., 2016; Verbrugge et al., 2017). Participatory monitoring can play a role, for example, in collecting and/or analyzing data about the current state of biodiversity (Eaton et al., 2017; Edgar et al., 2017), the water system (Breman et al., 2014; Buytaert et al., 2014), as well as landscape perceptions (Verbrugge et al., 2017).

7.3.3 Define an overarching maintenance vision

Thirdly, it is recommended that a clear definition is made, in a multi-actor setting, of an integrated and overarching maintenance vision for the Dutch floodplains. This shared vision should include goals that integrate and balance flood protection and nature objectives, as well as strategies and possible measures to maintain a dynamic multi-functional flood prone area under the pressure of climate change. The participant's shared underlying visions of nature presented in chapter two (representations of balance of nature, human-nature relationships and images of nature landscapes) provide a starting point for the formulation of the maintenance vision. Preferred preconditions, such as the preference of most stakeholders for a landscape in which one could experience the greatness and forces of nature (Chapter 2), could be used as guidelines for an overarching maintenance vision.

In addition, guidelines should be formulated on how to maintain the recreational, agricultural, economic and flood protection functions in the floodplains. In the case study presented, concerning the maintenance of the floodplains of the Waal river, either Rijkswaterstaat or the province of Gelderland should organize and initiate the process for defining a shared vision. Rijkswaterstaat and the province of Gelderland are responsible authorities for fulfilling flood protection goals and nature goals, respectively, which makes them powerful actors. Additionally, they have the resources to organize a multi-stakeholder process. Moreover, Rijkswaterstaat is already recognized by diverse stakeholders as a crucial collaborative partner (Chapter 4).

7.3.4 Create space for practical experiments

To implement new collaborative initiatives, such as participatory monitoring, and to test the usability of an overarching maintenance vision, authorities need to establish or facilitate practical pilot studies. In other words, it is recommended that more opportunities to experiment with establishing pilot projects are created, for example, to experiment with the sharing of costs and benefits generated while collectively maintaining multi-functional floodplains. A practical experiment, learning-by-doing or adaptive experimentation (Cook et al., 2004) enables stakeholders to do things in innovative ways. For example, to collaborate with unfamiliar organizations or to implement new maintenance strategies or measures, all with the motive of learning how to cope in practice while exposed to rapidly changing environmental (dynamic floodplains) as well as social conditions (discontinuation of a central actor). To enhance learning-by-doing experiences, authorities and other stakeholders should create flexibility in processes, policies, time and resources. Authorities could temporarily remove policy restrictions in certain areas by designating pilot areas. The *"Rijnwaardense"* floodplains (Chapter 5) could be used as a pilot project. In addition, the collaborative process should be facilitated through adaptable agreements and flexible budgets. More openness to experimentation and learning by policy-makers will enhance our understanding of how to design effective collaborative governance (Newig et al., 2016).

7.3.5 Perform longitudinal monitoring of collaboration

Most previous research on collaboration has relied on case studies or analyses of collaboration at a particular point in time, whereas only few have studied collaboration over longer time periods (e.g., Lange et al., 2013; Schuett et al., 2001). This means that little attention has been devoted to longitudinal research. A longitudinal perspective is needed to demonstrate the effectiveness of collaborative governance as outputs and outcomes often only become visible with time (Margerum et al., 2016). Therefore, I recommend the monitoring and evaluation of collaborative arrangements over long periods of time (10-20 years), including analysis of feedback loops that improve the collaborative process and maintain a robust strategy. Future research should focus on how collaborative processes and stakeholder's frames on collaboration transform over time, and how collaborative governance prescribes ways of improving policy making with regard to maintaining multi-functional floodplains. I strongly support Ansell and Gash (2008, p. 560) in their statement *"collaborative governance strategies are particularly suited for situations that require ongoing cooperation"*. This is definitely the case in the maintenance of multi-functional floodplains.

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SUMMARY

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Climate change and the need for sustainable river systems have led countries all over the world to refocus their attention on integrated river basin management. In order to integrate the visions and interests of different stakeholders, a more collaborative approach is needed. In the Netherlands, this strategy is reflected in the "Room for the River" program that restored the multiple functions of floodplains. By making use of a multi-stakeholder process, Dutch authorities moved away from the predominantly agricultural use of floodplains and towards a complex mosaic of functions that combines flood protection and nature restoration, while also accounting for economic, recreational and agricultural interests. As a result, biodiversity has increased spectacularly in areas where this integrated approach has been implemented. However, upcoming riparian vegetation causes an increase in flood risk due to a reduction of water discharge capacity. Vegetation management conflicts with the interests of nature managers and nature legislation and is, therefore, not an easy task. Alongside this *"nature-safety"* dilemma, the governance of multifunctional floodplains has become rather complex due to the diversity of actors and sectors involved, each with their own frames and interests. This complexity is reflected particularly in issues surrounding the maintenance of multifunctional floodplains. Maintenance is also complicated by long-term perspectives, changing actor configuration, fragmented properties and declining state budgets. Despite a broad recognition of the importance of collaboration, stakeholders struggle with the question of how to shape collaborative governance in the context of integrated river basin management. Therefore, the aim of the present thesis is to explore and describe the complexity of the current collaborative interactions between governmental and non-governmental actors with regard to the maintenance of Dutch floodplains in order to get insight in the barriers and opportunities for collaborative governance from a stakeholders perspective.

The theory of framing is used to explore the above research aim. In collaborative processes diverse stakeholders work together by bringing diverse or even conflicting frames to the decision-making process. A frame refers to how people think about or perceive something. Conflicting frames in a collaborative process often form a barrier for shared understanding and collaboration. The theory of framing states that stakeholders may hold frames relating to issues, relationships and processes (**chapter 1**). These stakeholder frames are explored by using case study analysis. Case studies allow researchers to study complex collaborative processes within their contexts. In this thesis, case studies describing collaborative processes with respect to the maintenance of multi-functional floodplains in the Netherlands are presented. Case studies were analyzed by using qualitative methods, such as conducting interviews and participant observation, and quantitative methods, such as surveys.

In **chapter 2,** I describe empirically how issues with respect to floodplain maintenance are framed by different stakeholders. Analysis of interviews revealed that stakeholders emphasized that floodplain maintenance is confronted by singular and conflicting objectives, interests and policies, in particular with respect to flood protection and nature conservation issues. I conclude that an integrated planning approach has not been incorporated into the maintenance strategies and programs, inter alia by the lack of an integrated vision of floodplain maintenance. This implies that innovative management strategies, such as Cyclic Floodplain Rejuvenation, are proven to be incompatible with *"inflexible"* regulations such as Natura2000's conservation goals and flood protection norms. Despite negative frames with regard to the establishment of an independent floodplain management organization (Stewardship Council), stakeholders emphasize the need for more collaborative initiatives. Moreover, the participant's shared underlying dynamic nature vision of floodplains may provide a starting point for shared understanding and collaboration.

To get a better understanding of issue frames with respect to collaboration, I explore in **chapter 3** how stakeholders framed collaborative objectives and associated public-private structures. Video recordings of stakeholder meetings were analyzed and showed that participants envisioned a shared governance structure. However, no consensus was attained on the underlying collaborative objectives. I argue that the envisioned structure revealed a tendency towards separation instead of integration, because participants abandoned the idea of public-private collaboration which had previously been adopted in the planning and implementation phases.

In **chapter 4**, I explore the collaborative relationships between diverse stakeholders in order to gain insight into the degree of fragmentation or integration in floodplain maintenance. Forty-three organizations described their collaborative relationships with respect to the maintenance of flood protection levels (blue network) and/or nature management (green network). Social network analysis revealed two well-connected and heterogeneous networks. However, analysis of the most frequent relationships (monthly and weekly ties) showed that few collaborative ties exist between organizations focusing on either flood protection or nature management goals. Moreover, the loss of the most central actor (Government Service for Land and Water Management), which functioned as a coordinating organization, enhanced this fragmentation. Finally, it is demonstrated that Dutch governmental organizations still have a dominant and controlling role in floodplain management. This forms a barrier to the initiation of shared responsibilities within collaborative governance initiatives.

In **chapter 5**, I describe and analyze an unsuccessful regional case study in which no collaborative agreements to maintain multi-functional floodplains were achieved. Stakeholder's frames were examined with respect to the following components: incentives, collaborative process, allocation of tasks including related responsibilities, and outcomes. The results demonstrated the mismatch between outcomes of the collaborative processes on the organizational and action level, which obstructed collaborative floodplain management. In terms of the allocation of tasks, stakeholders framed flood protection objectives particularly as governmental responsibilities, while nature conservation objectives were framed as a shared responsibility. Governmental organizations used conflicting collaborative strategies, namely a strategy based on cost-efficiency (financial) versus a strategy based on working together with a platform of local nature organizations. This obstructed effective collaborative governance aimed at maintaining multi-functional floodplains.

The previous chapters describe the fragmented field of Dutch floodplain management. In **chapter 6,** I address how the effective elements of the Joint Planning Approach can be applied to formulate a framework for collaborative floodplain management, i.e., a Joint Maintenance Approach (JMA). This maintenance framework is illustrated using three case studies of floodplain management: one top-down and mono-functional, and two multi-stakeholder and multi-functional. It appears that the maintenance of multi-functional floodplains is subject to (1) unavoidable top-down decision making (i.e., flood protection objectives), (2) collaborative elements, and (3) conflicts of interests. These three elements suggest that a JMA may bring considerable opportunities for the integration of the currently fragmented field of floodplain management. A JMA is based on elements of a deliberative process, but it recognizes that not the entire process can be "joint" (referring to unavoidable top-down decisions) in contrast with a deliberative approach. A JMA seeks a balance between top-down and bottom-up decision making, promotes flexible budgets and time limits, and emphasizes the importance of learning through debate-oriented processes.

In **chapter 7**, I revealed three barriers that hinder sustainable collaboration within the context of floodplain maintenance. Based on my results from chapter 2 to 6, I argue that (1) the lack of shared responsibility, (2) the lack of shared visions, and (3) the lack of sharing efforts and benefits, hinder collaborative governance. These main barriers need to be addressed in order to achieve better collaboration. Barriers include the nested hierarchy of multiple governmental organizations, the fragmented issue frames on collaborative objectives, the lack of locally based frames, fragmented collaborative relationships, and the conflicting process frames held by stakeholders. However, an exploration of the complexity of the current collaborative interactions among stakeholders indicated opportunities for collaborative governance. These opportunities are expressed in the form of five recommendations. Firstly, it is recommend that a Joint Maintenance Approach is adopted that emphasizes the importance of applying more collaborative approaches in floodplain management. Secondly, it is recommended that interactive tools are made use of to accelerate and support collaborative processes, and to establish participatory monitoring projects to promote understanding of locally based frames and enhance shared responsibility. Thirdly, it is recommended that an overarching maintenance vision is defined by making use of participant's shared underlying dynamic nature vision of floodplains. Fourthly, it is recommended that space for practical experiments (learning-by-doing) is created in an effort to explore opportunities and threats for sharing efforts and benefits while collectively maintaining multi-functional floodplains. Finally, it is recommended that longitudinal monitoring of collaboration is performed in view of the time required for new collaborative initiatives to succeed.

SAMENVATTING

SAMENVATTING

Door klimaatverandering en de noodzaak tot verduurzaming van riviersystemen zijn landen zich wereldwijd gaan focussen op integraal rivierbeheer. Om de visies en interesses van verschillende belanghebbenden te integreren, is meer samenwerking nodig. In Nederland is deze strategie weerspiegeld in het programma “Ruimte voor de Rivier”, een programma waarmee de multifunctionele uiterwaarden zijn hersteld. Middels een participatief proces veranderde de Nederlandse autoriteiten de overwegend agrarische functie van de uiterwaarden naar een combinatie van waterveiligheidsfuncties en natuurontwikkeling waarbij rekening werd gehouden met economische, recreatieve en agrarische belangen. Als gevolg hiervan nam de biodiversiteit spectaculair toe in gebieden waar deze geïntegreerde aanpak was geïmplementeerd. Echter, de opkomende vegetatie in de uiterwaarden veroorzaakte een toename van het overstromingsrisico door het verminderen van de waterafvoercapaciteit. Het verwijderen van deze vegetatie is in strijd met de belangen van natuurbeheerders en –wetgeving en is daarom geen eenvoudige zaak. Naast dit “natuur-veiligheidsdilemma” is het beheer van multifunctionele uiterwaarden nogal complex geworden door de diversiteit van betrokken actoren en sectoren, elk met hun eigen frames en interesses. Deze complexiteit komt vooral tot uiting in problemen rondom het beheer en onderhoud van multifunctionele uiterwaarden. Het beheer wordt tevens gecompliceerd door de lange termijn perspectieven, veranderende actor configuratie, versnipperde eigendommen en dalende overheidsbudgetten. Ondanks een brede erkenning van het belang van samenwerken worstelen belanghebbenden met de vraag hoe deze samenwerking opgezet moet worden in de context van integraal rivier- en uiterwaardenbeheer. Daarom is het doel van dit proefschrift om de complexiteit van de huidige samenwerkingsinteracties tussen overheids- en niet-gouvernementele actoren ten aanzien van het beheer en onderhoud van de Nederlandse uiterwaarden te onderzoeken en te beschrijven om barrières en kansen voor samenwerking vanuit een stakeholderperspectief vast te stellen.

In dit onderzoek is de theorie van framing gebruikt. In samenwerkings- en besluitvormingsprocessen werken belanghebbenden met verschillende of zelfs tegenstrijdige frames samen. Een frame verwijst naar hoe mensen denken of iets waarnemen. Conflicterende frames in een samenwerkingsproces vormen vaak een belemmering voor gedeeld begrip en succesvolle samenwerking. Framingtheorieën stellen dat de frames van belanghebbenden betrekking kunnen hebben op issues, relaties en processen (**hoofdstuk 1**). De frames van belanghebbenden worden onderzocht middels een casestudie. Casestudies stellen onderzoekers in staat om complexe samenwerkingsprocessen in hun context te analyseren. De casestudies in dit proefschrift gaan over samenwerkingsprocessen betreffende het beheer en onderhoud van multifunctionele uiterwaarden in Nederland. De casestudies zijn geanalyseerd met behulp van kwalitatieve methoden, zoals interviews en observaties, en kwantitatieve methoden, zoals enquêtes.

In **hoofdstuk 2**, beschrijf ik empirisch onderzoek naar hoe problemen met betrekking tot het uiterwaardenbeheer worden geframed door de belanghebbenden. Analyse van de interviews laat

zien dat het beheer van de uiterwaarden, volgens de belanghebbenden, wordt geconfronteerd met eenzijdige en tegenstrijdige doelstellingen, belangen en beleidsmaatregelen, voornamelijk ten aanzien van de onderwerpen; waterveiligheid en natuurbeheer. Ik concludeer dat een geïntegreerde planningsbenadering ontbreekt in de beheer en onderhoudsstrategieën, onder meer door het gebrek aan een integrale visie op het beheer van de uiterwaarden. Dit impliceert dat innovatieve beheerstrategieën, zoals cyclisch uiterwaardenbeheer, onverenigbaar zijn met de rigide regelgeving, zoals de Natura2000 instandhoudingsdoelen en de normering van waterveiligheidsdoelen. Ondanks negatieve frames ten aanzien van het oprichten van een onafhankelijke beheersorganisatie (waardschap), benadrukken de belanghebbenden de noodzaak voor meer samenwerking. Daarnaast zou de gedeelde onderliggende, dynamische natuurvisie ten aanzien van de uiterwaarden, die belanghebbenden hebben, een startpunt kunnen vormen voor gedeeld begrip en samenwerking.

Om een beter inzicht te krijgen in de barrières omtrent samenwerken, onderzoek ik in **hoofdstuk 3** hoe belanghebbenden samenwerkingsdoelen en de bijbehorende publieke-private structuren framen. Videobeelden van stakeholderbijeenkomsten zijn geanalyseerd en laten zien dat de betrokkenen een gedeelde samenwerkingsstructuur voor ogen hebben. Er is echter geen consensus bereikt over de onderliggende samenwerkingsdoelstellingen. Ik betoog dan ook dat de beoogde structuur verdeeldheid in plaats van integratie aantoont, omdat de betrokkenen het idee van een publiek-private samenwerking hebben verlaten, dat eerder in de inrichtingsfase van de uitwaarden was geadopteerd.

In **hoofdstuk 4**, onderzoek ik de samenwerkingsrelaties tussen verschillende belanghebbenden om inzicht te krijgen in de mate van versnippering of integratie in het beheer van de uiterwaarden. Van drieënveertig organisaties zijn de samenwerkingsrelaties ten aanzien van het beheer en onderhoud omtrent waterveiligheidsdoelstellingen (blauw netwerk) en natuurbeheer (groen netwerk) beschreven. De sociale netwerk analyse toonde twee goed verbonden, heterogene netwerken aan. Echter, de analyse van de meest voorkomende relaties (maandelijkse en wekelijkse verbanden) laat zien dat er weinig samenwerkingsverbanden bestaan tussen waterbeherende organisaties en natuurbeherende organisaties. Bovendien heeft het verlies van de meest centrale actor (Dienst Landelijk Gebied), die fungeerde als een coördinerende organisatie, deze versplintering doen toenemen. Tenslotte wordt aangetoond dat de Nederlandse overheden nog steeds een dominante en controlerende rol vervullen in het uiterwaardenbeheer. Dit vormt een belemmering voor het creëren van een gedeelde verantwoordelijkheid binnen samenwerkende initiatieven.

In **hoofdstuk 5**, beschrijf en analyseer ik een regionale casestudie waarbij geen samenwerkingsovereenkomsten voor het beheren van de uiterwaarden werden behaald. De frames van de belanghebbenden zijn onderzocht ten aanzien van de volgende onderwerpen: motivaties, het samenwerkingsproces, de verdeling van taken en verantwoordelijkheden, en de uitkomsten. De resultaten tonen aan dat de uitkomsten van het samenwerkingsproces op het organisatorische niveau en actie niveau niet verenigbaar zijn, hetgeen gezamenlijk uiterwaardenbeheer belemmerd. Wat de verdeling van taken betreft, framen de belanghebbenden waterveiligheidsdoelen

als een verantwoordelijkheid van de overheid, terwijl de natuurdoelstellingen worden geframed als een gezamenlijke verantwoordelijkheid. De overheden gebruiken tegenstrijdige samenwerkingsstrategieën, namelijk een benadering gebaseerd op kosten-efficiëntie (financieel) tegenover een benadering gebaseerd op samenwerking met een lokaal platform van natuurbeherende organisaties. Dit belemmerd een effectieve samenwerking die ten doel heeft multifunctionele uiterwaarden te beheren.

De vorige hoofdstukken beschrijven het versnipperde speelveld van het uiterwaardenbeheer in Nederland. In **hoofdstuk 6** zal ik mij richten op hoe de effectieve elementen van een gezamenlijke planningsbenadering (Joint Planning Approach) kunnen worden gebruikt als een kader voor het vormgeven van gezamenlijk uiterwaardenbeheer, dat wil zeggen een gezamenlijke beheerbenadering (Joint Maintenance Approach). Dit beheer- en onderhoudskader wordt onderzocht aan de hand van drie casestudies over uiterwaardenbeheer: een top-down en monofunctionele casestudie, en twee multi-stakeholder en multifunctionele casestudies. Het lijkt er op dat het uiterwaardenbeheer bestaat uit (1) onvermijdelijke top-down besluitvorming (m.a.w. waterveiligheidsdoelstellingen), (2) elementen van samenwerken en (3) belangenconflicten. De aanwezigheid van deze drie aspecten suggereren dat een gezamenlijke beheerbenadering kansrijk is om het momenteel versnipperde speelveld van het uiterwaardenbeheer te integreren. Een gezamenlijke beheerbenadering zou gebaseerd moeten zijn op elementen van een deliberatieve besluitvormingsproces, waarbij erkent wordt dat het gehele proces niet “gezamenlijk” kan zijn (zie onvermijdelijke top-down beslissingen). Een gezamenlijke beheerbenadering streeft naar een balans tussen top-down en bottom-up besluitvorming, bevordert flexibele budgetten en tijdslimieten, en benadrukt het belang van leren door middel van debatgerichte processen.

In **hoofdstuk 7**, benoem ik drie barrières die duurzame samenwerking belemmeren in het kader van het uiterwaardenbeheer. Op basis van mijn bevindingen uit de hoofdstukken 2 tot en met 6, ben ik van mening dat samenwerking wordt belemmerd door (1) een gebrek aan een gedeelde verantwoordelijkheid, (2) het gebrek aan een gezamenlijke visie, en (3) een gebrek aan het verdelen van de lusten en lasten. Deze belangrijke barrières zullen eerst moeten worden geadresseerd om betere samenwerking te bevorderen. De barrières behelzen de genestelde hiërarchische overheidsstructuur, de versnipperde frames ten aanzien van samenwerkingsdoelen, het ontbreken van lokale frames, de geringe samenwerkingsrelaties, en de tegenstrijdige procesframes die door de belanghebbenden worden getoond. Daarentegen duidt een verkenning van de complexiteit van de huidige samenwerkingsinteractie tussen belanghebbenden op kansen voor samenwerking. Deze kansen zijn aangeduid in de vorm van vijf aanbevelingen. In de eerste plaats wordt aangeraden om een gezamenlijke beheerbenadering (besluitvormingsproces) te adopteren, die het belang van meer samenwerken in het uiterwaardenbeheer benadrukt. Ten tweede wordt aanbevolen dat interactieve instrumenten worden gebruikt om samenwerkingsprocessen te versnellen en te ondersteunen en om participatieve monitoringsprojecten te ontwikkelen om inzicht te krijgen in lokale frames en een gezamenlijke verantwoordelijkheid te bevorderen. Ten derde wordt aanbevolen dat er een

overkoepelende beheervisie wordt gedefinieerd op basis van de gedeelde onderliggende dynamische natuurvisie van de belanghebbenden. Ten vierde wordt aanbevolen dat er ruimte wordt gecreëerd voor praktische experimenten (leren door te doen), in een poging om kansen en bedreigingen te onderzoeken voor het delen van de lusten en de lasten bij het collectief beheren van de uiterwaarden. Ten slotte wordt aanbevolen dat lange termijn monitoring van de samenwerkingen wordt uitgevoerd met het oog op de tijd die nodig is voor het slagen van nieuwe samenwerkingsinitiatieven.

SUPPLEMENTARY DATA TO CHAPTER 4

1. CENTRALITY MEASURES AND ORGANIZATIONAL ATTRIBUTES

1.1 Blue network

Table SD-A shows the results of the network analysis regarding **flood protection** objectives. The table shows two different degree centralities: (1) the out- and in-degree, and (2) the degree centrality based on reciprocal ties in the network. The table is sorted to the degree reciprocal scores. Additionally, the betweenness values are analyzed for the reciprocal ties. The organizational attributes indicate the abbreviation and type of organization; Gov. = governmental organization or nongov. = non-governmental organization. The abbreviation relates to the defined task or function of the group; flood protection (Fld); nature (Nat); agriculture (Agr); research institutes (Res); special interest groups (NGO / Businesses / Citizens) (Int); coordinators or spatial planning (Crd).

Table SD-A | Degree centrality measures and organizational attributes regarding flood protection objectives.

Nr.	Abbre-viation	Stakeholder	Outdeg	Indeg	Deg. reciprocal	Betweenness - reciprocal	Gov/ nongov
9	Crd1	Government Service for Land and Water Management	40	29	28	132	gov.
7	Fld1	Delta Program: Rivers	33	30	27	120	gov.
31	Nat7	State Forestry Service: region east	41	17	17	27	gov.
30	Int7	Citizen platform: *Spiegelgroep Waal-Weelde*	42	16	16	53	nongov.
27	Res4	Radboud University	21	20	15	19	nongov.
32	Nat8	State Forestry Service: region east: district river landscape	36	16	15	21	gov.
13	Nat3	Federation for nature and environment of Gelderland	29	19	14	25	nongov.
1	Agr1	Association of agriculture and nature management: *'Lingestreek'*	37	12	12	29	nongov.
42	Fld6	Water Board: *'Rivier-enland'*	20	20	11	27	gov.
10	Int3	Federation of sand, gravel, clay and limestone mining industries	27	12	10	4	nongov.
12	Nat2	Foundation of Gelderse landscapes and castles	28	12	10	7	nongov.
22	Int6	K3Delta	30	13	10	19	nongov.

Table SD-A | continued

Nr.	Abbre-viation	Stakeholder	Outdeg	Indeg	Deg. reciprocal	Betweenness - reciprocal	Gov/ nongov
28	Fld3	Directorate for Public Works and Water Management: East	12	30	10	6	gov.
33	Nat9	ARK Foundation	17	19	10	6	nongov.
41	Fld5	Water Board: *'Rijn en IJsel'*	20	14	10	8	gov.
16	Crd4	Municipality of Nijmegen	20	15	9	4	gov.
29	Fld4	Directorate for Public Works and Water Management: East: district south	23	14	9	4	gov.
14	Crd2	Municipality of Beuningen	14	14	8	3	gov.
8	Res3	Deltares	10	16	7	2	nongov.
17	Crd5	Municipality of Rijn-waarden	11	15	7	4	gov.
21	Int5	Citizen platform (Hoogwaterplatform)	17	11	7	2	nongov.
23	Nat4	Ministry of Economic Affairs	13	18	6	1	gov.
2	Res1	Alterra: research institute	5	17	5	0	nongov.
39	Int9	Citizen platform: *'de Verrekijkers'*	8	13	5	0	nongov.
43	Nat11	World Wildlife Fund	8	14	5	1	nongov.
18	Crd6	Municipality of Tiel	10	11	4	0	gov.
19	Crd7	Municipality of Zalt-bommel	5	12	4	0	gov.
35	Int8	Foundation Symbiose	16	7	4	0	nongov.
36	Agr3	Association *'Rijn-strangen'*	5	8	4	1	nongov.
38	Agr5	Association of agri-culture and nature management: *'de Capreton'*	19	8	4	0	nongov.
24	Fld2	Ministry of Infra-structure and the Environment	4	22	3	0	gov.
3	Agr2	Association of three farmers: *"Opheusden en Omgeving"*	2	4	2	0	nongov.

Table SD-A | continued

Nr.	Abbre-viation	Stakeholder	Outdeg	Indeg	Deg. reciprocal	Betweenness - reciprocal	Gov/ nongov
5	Int1	Cascade, association of sand and gravel industries	4	14	2	0	nongov.
6	Int2	Dekker groep	5	18	2	0	nongov.
15	Crd3	Municipality of Lingewaard	5	14	2	0	gov.
20	Int4	Federation for anglers	3	13	2	0	nongov.
4	Res2	Federation for forest and nature (O+bn)	0	9	0	0	nongov.
11	Nat1	FREE (Foundation for Restoring European Ecosystems) Nature	0	13	0	0	nongov.
25	Nat5	Natuurmonumenten	0	17	0	0	nongov.
26	Nat6	Province of Gelderland: program nature	0	19	0	0	gov.
34	Nat10	Foundation *'Lingewaard Natuurlijk'*	0	6	0	0	nongov.
37	Agr4	Association of agriculture and nature management: '*Rijk Maas en Waal*'	0	6	0	0	nongov.
40	Res5	Wageningen University & Research Centre	0	13	0	0	nongov.

1.2 GREEN NETWORK

Table SD-B shows the results of the network analysis regarding **nature** objectives. The table shows two different degree centralities: (1) the out- and in-degree and (2) the degree centrality based on reciprocal ties in the network. The table is sorted to the degree reciprocal scores. Additionally, the betweenness values are analyzed for the reciprocal ties. The organizational attributes indicate the abbreviation and type of organization; Gov. = governmental organization or nongov. = non-governmental organization. The abbreviations relate to the defined task or function of the group; flood protection (Fld); nature (Nat); agriculture (Agr); research institutes (Res); special interest groups (NGO / Businesses / Citizens) (Int); coordinators or spatial planning (Crd).

Table SD-B | Centrality measures and organizational attributes regarding nature objectives.

Nr.	Abbre-viation	Stakeholder	Outdeg	Indeg	Deg. reciprocal	Betweenness - reciprocal	Gov/ nongov
9	Crd1	Government Service for Land and Water Management	40	35	34	204	gov.
31	Nat7	State Forestry Service: region east	40	25	24	89	gov.
7	Fld1	Delta Program: Rivers	33	27	23	94	gov.
32	Nat8	State Forestry Service: region east: district river landscape	37	21	19	34	gov.
13	Nat3	Federation for nature and environment of Gelderland	31	20	17	30	nongov.
27	Res4	Radboud University	20	24	17	37	nongov.
30	Int7	Citizen platform: *Spiegelgroep Waal-Weelde*	42	16	16	76	nongov.
1	Agr1	Association of agriculture and nature management: *'Lingestreek'*	38	15	15	39	nongov.
12	Nat2	Foundation of Gelderse landscapes and castles	28	17	15	18	nongov.
33	Nat9	ARK Foundation	25	20	15	14	nongov.
22	Int6	K3Delta	30	16	12	11	nongov.
10	Int3	Federation of sand, gravel, clay and limestone mining industries	27	13	11	7	nongov.
23	Nat4	Ministry of Economic Affairs	13	22	11	9	gov.
43	Nat11	World Wildlife Fund	16	14	11	4	nongov.
4	Res2	Federation for forest and nature (O+bn)	20	14	10	10	nongov.
11	Nat1	FREE (Foundation for Restoring European Ecosystems) Nature	14	17	10	6	nongov.
28	Fld3	Directorate for Public Works and Water Management: East	12	29	10	9	gov.
29	Fld4	Directorate for Public Works and Water Management: East: district south	24	16	10	5	gov.

Table SD-B | continued

Nr.	Abbre-viation	Stakeholder	Outdeg	Indeg	Deg. reciprocal	Betweenness - reciprocal	Gov/ nongov
16	Crd4	Municipality of Ni-jmegen	17	17	9	3	gov.
42	Fld6	Water Board: Rivier-enland	19	24	9	17	gov.
14	Crd2	Municipality of Beun-ingen	16	15	8	2	gov.
15	Crd3	Municipality of Linge-waard	11	15	8	1	gov.
25	Nat5	Natuurmonumenten	12	20	8	1	nongov.
26	Nat6	Province of Gelder-land: program nature	12	21	8	2	gov.
38	Agr5	Association of agricul-ture and nature man-agement: *'de Capreton'*	21	13	8	3	nongov.
2	Res1	Alterra: research institute	7	20	7	3	nongov.
17	Crd5	Municipality of Rijn-waarden	11	16	7	6	gov.
34	Nat10	Foundation *'Linge-waard Natuurlijk'*	10	9	7	1	nongov.
6	Int2	Dekker groep	12	19	6	1	nongov.
8	Res3	Deltares	9	18	6	3	nongov.
40	Res5	Wageningen University & Research Centre	8	17	6	4	nongov.
21	Int5	Citizen platform (Hoogwaterplatform)	12	10	5	1	nongov.
35	Int8	Foundation Symbiose	15	6	4	0	nongov.
37	Agr4	Association of agri-culture and nature management: '*Rijk Maas en Waal*'	8	8	4	0	nongov.
39	Int9	Citizen platform: *'de Verrekijkers'*	7	12	4	0	nongov.
24	Fld2	Ministry of Infrastruc-ture and the Environ-ment	3	20	3	0	gov.
36	Agr3	Association *'Rijnstran-gen'*	7	9	3	0	nongov.
3	Agr2	Association of three farmers: *"Opheusden en Omgeving"*	2	4	2	0	nongov.
18	Crd6	Municipality of Tiel	3	11	2	0	gov.

Table SD-B | continued

Nr.	Abbre-viation	Stakeholder	Outdeg	Indeg	Deg. reciprocal	Betweenness - reciprocal	Gov/ nongov
19	Crd7	Municipality of Zalt-bommel	3	12	2	0	gov.
5	Int1	Cascade, association of sand and gravel industries	2	15	1	0	nongov.
20	Int4	Federation for anglers	5	13	1	0	nongov.
41	Fld5	Water Board: Rijn en IJssel	0	17	0	0	gov.

2. ANALYSIS OF DENSITY VALUES FOR GROUPS

2.1 Density by group in the blue network

Table SD-C | The cross-table indicates the density values between and among groups within the blue network (all frequencies). The highest density score of each group (rows) is emphasized (bold) indicating the strongest crosslink with another group (or itself).

Group number	1	2	3	4	5	6
Flood protection (N= 6)	0.600	0.258	0.067	0.267	0.148	0.405
Nature (N= 11)	0.258	0.164	0.091	0.073	0.182	0.195
Agriculture (N= 5)	0.067	0.091	0.300	0.040	0.089	0.114
Research (N= 5)	0.267	0.073	0.040	0.300	0.089	0.114
Interest groups (N= 9)	0.148	0.182	0.089	0.089	0.222	0.127
Coordination or spatial planning (N= 7)	0.405	0.195	0.114	0.114	0.127	0.333

2.2 Density by group in the green network

Table SD-D | The cross- table indicates the density values between and among groups within the green network (all frequencies). The highest density score of each group (rows) is emphasized (bold) indicating the stronges crosslink with another group (or itself).

Group number	1	2	3	4	5	6
Flood protection (N= 6)	0.400	0.258	0.033	0.233	0.111	0.286
Nature (N= 11)	0.258	0.473	0.200	0.291	0.212	0.364
Agriculture (N= 5)	0.033	0.200	0.500	0.080	0.044	0.171
Research (N= 5)	0.233	0.291	0.080	0.600	0.089	0.143
Interest groups (N= 9)	0.111	0.212	0.044	0.089	0.250	0.143
Coordination or spatial planning (N= 7)	0.286	0.364	0.171	0.143	0.143	0.238

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ABOUT THE AUTHOR

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Jan Fliervoet studied environmental science at the Radboud University and completed his masters with a special topic about Science in Society. Studying environmental science, he learned the importance of being a "boundary worker", in other words working in interdisciplinary teams. After obtaining his master's degree, he started to work at the Institute for Science in Society as a junior researcher. His first assignment was to organize a two-days floodplain management conference (June 2011) and the 8th annual conference of the International Society for Environmental Ethics, "Old World and New World Perspectives on Environmental Philosophy" (June 2011). From September 2011, he participated in a two-years scientific research program, called Urban Regions in the Delta (http://urd.verdus.nl/delta-oost). This program marked the start of his PhD thesis on collaborative governance with respect to the maintenance of Dutch floodplains. He continued his PhD research in a national research program "RiverCare: towards self-sustaining multifunctional rivers" (http://www.ncr-web.org/rivercare). This scientific research program aims to understand the adaptations in river systems by monitoring the consequences of measures which are implemented in the "Room for the River" program and the Delta program. In this research program, he focused on collaboration as a way of solving problems, addressing concerns or achieving results instead of improving the theoretical concept of collaboration.

In sum, Jan has a strong affinity with the ecological, socio-economic and governance aspects of river basin management. His research interests include collaborative governance, river basin management, serious gaming, citizen science and participatory monitoring. He currently works as a postdoctoral researcher at the Institute for Science in Society of the Radboud University and as a project leader for the professorship Sustainable Water Systems at Van Hall Larenstein University of Applied Sciences.

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